ORDER NO. SD82112334C8

# Service Manual

DC Servo Automatic Turntable System

# SL-3

[E], [EK], [XL], [EG], [EB], [EF], [XA], [EH], [Ei], [EC], [XM]

# SL-3(K)

[E], [EK], [EG], [EF]

T4P is the standard mark for the "P-mount" plug-in-connector system. Products carrying this mark are inter-changeable and compatible with each other.

***The cabinet and dust cover are available in black color and silver types.**
***The black type model is provided with (K) in the Service Manual.**

**Areas**

- * [E] is available in Switzerland and Scandinavia.
- * [EK] is available in United Kingdom.
- * [XL] is available in Australia.
- * [EG] is available in F.R. Germany.
- * [EB] is available in Belgium.
- * [EF] is available in France.
- * [XA] is available in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.
- * [EH] is available in Holland.
- * [Ei] is available in Italy.
- * [EC] is available in Czechoslovakia.
- * [XM] is available in Central South America.

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English

## Specifications

Specifications are subject to change without notice for further improvement.
Weight and dimensions shown are approximate.

### ■ General

| | |
|---|---|
| **Power supply:** | 220 V, 50/60 Hz |
| **Power consumption:** | 7 W |
| **Dimensions:** (W x H x D) | 31.5 x 8.8.x 31.5 cm (12-1/2" x 3-1/2" x 12-1/2") 31.5 x 39 x 31.5 cm (12-1/2" x 15-23/64" x 12-1/2") (Maximum height when top (dust cover) is open.) |
| **Weight:** | 3.2 kg (7.1 lb.) |

### ■ Turntable section

| | |
|---|---|
| **Type:** | Automatic turntable |
| **Features:** | Auto start/Auto lead-in<br>Auto return<br>Auto stop<br>Repeat play<br>Auto speed select<br>Manual speed selection possible<br>Auto size select<br>Record presence detection |
| **Drive method:** | Belt drive |
| **Motor:** | DC motor |
| **Drive control method:** | DC servo control |
| **Turntable platter:** | Aluminum die-cast<br>Diameter 30 cm (12") |
| **Turntable speeds:** | 33-1/3 rpm and 45 rpm<br>Auto speed select<br>(Manual selection possible) |

Technics

**Matsushita Electric Trading Co., Ltd.**
P.O. Box 288, Central Osaka Japan

| | |
|---|---|
| **Wow and flutter:** | 0.045% WRMS (JIS C5521)<br>±0.06% peak<br>(IEC 98A Weighted) |
| **Rumble:** | −70 dB (IEC 98A Weighted) |

■ **Tonearm section**

| | |
|---|---|
| **Type:** | Dynamic balanced type<br>Linear tracking tonearm<br>4-pivot gimbal suspension |
| **Effective length:** | 10.5 cm (4-1/8") |
| **Tracking error angle:** | Within ±0.1° |
| **Effective mass:** | 9 g (including cartridge) |
| **Resonance frequency:** | 12 Hz |
| **Tonearm drive motor:** | DC motor |
| **Phono cable capacitance:** | 150 pF |

■ **Cartridge section**

| | |
|---|---|
| **Type:** | Moving magnet stereo cartridge |
| **Magnetic circuit:** | All laminated core |
| **Frequency response:** | 10 Hz ~ 30 kHz<br>20 Hz ~ 10 kHz ±1 dB |
| **Output voltage:** | 2.5 mV at 1 kHz, 5 cm/s. zero to peak lateral velocity<br>(7 mV at 1 kHz, 10 cm/s. zero to peak 45° velocity [DIN 45 500]) |
| **Channel separation:** | 22 dB at 1 kHz |
| **Channel balance:** | Within 2 dB at 1 kHz |
| **Recommended load impedance:** | 47 kΩ ~ 100 kΩ |
| **Compliance (dynamic):** | 12 x $10^{-6}$ cm/dyne at 100 Hz |
| **Stylus pressure range:** | 1.25 ± 0.25 g (12.5 ± 2.5 mN) |
| **Weight:** | 6.0 g (cartridge only) |
| **Replacement stylus:** | EPS-24CS |

- The power supply for this unit varies depending upon the areas. Also, the parts used for power supply are different. So, refer to the circuit diagram and the replacement parts list.
  - ★ 220V (50/60 Hz) for Continental Europe.
  - ★ 240V (50/60 Hz) for United Kingdom and Australia.
  - ★ 110V/120V/220V/240V (50/60 Hz) for other areas.
  - — [XA and XM areas] for other areas is provided with voltage selector.

Deutsch

# TECHNISCHE DATEN

Änderungen der technischen Daten vorbehalten.
Die angegebenen Gewichts- und Abmessungsdaten sind circa Werte.

■ **Allgemeine Daten**

| | |
|---|---|
| **Stromversorgung:** | 220 V, 50/60 Hz<br>Wechselstrom |
| **Leistungsaufnahme:** | 7 W |
| **Abmessungen:** | 31,5 x 8,8 x 31,5 cm |
| **(B x H x T)** | 31,5 x 39 x 31,5 cm<br>(Maximale Höhe bei vollständig geöffnetem Gehäuseoberteil.) |
| **Gewicht:** | 3,2 kg |

■ **Plattenspieler**

| | |
|---|---|
| **Typ:** | Automatischer Plattenspieler<br>Auto-Start/Auto-Zuführung<br>Rückführautomatik<br>Stopp-Automatik<br>Wiederhol-Betrieb<br>Automatische Drehzahlwahl<br>Manuelle Drehzahlwahl möglich<br>Automatische Plattengrößewahl<br>Plattenpräsenz-Registrierung |
| **Antrieb:** | Riemenantrieb |
| **Motor:** | Gleichstrommotor |
| **Antriebsregel-Methode:** | DC-Servo-Steuerung |
| **Plattenteller:** | Aluminium-Druckguß<br>Durchmesser 30 cm |
| **Plattenteller-Drehzahlen:** | 33-1/3 und 45 U/min<br>Automatische Drehzahlwahl<br>(manuelle Wahl möglich) |
| **Gleichlaufschwankungen:** | 0.045% WRMS (JIS C5521)<br>±0.06% Spitze<br>(IEC 98A bewertet) |
| **Rumpel-Fremdspannungsabstand:** | −70 dB (IEC 98A bewertet) |

■ **Tonarm**

| | |
|---|---|
| **Typ:** | Dynamisch ausbalancierter Tangential-Tonarm mit Kardanaufhängung mit 4-Punkt-Drehlager |
| **Effektive Länge:** | 10,5 cm |
| **Spurfehlwinkel:** | Innerhalb ±0.1° |
| **Effektive Masse:** | 9 g (einschließlich Tonabnehmer) |
| **Resonanzfrequenz:** | 12 Hz |
| **Tonarm-Antriebsmotor:** | Gleichstrommotor |

■ **Tonabnehmer**

| | |
|---|---|
| **Typ:** | Stereo-Magnet-Tonabnehmer mit Einpunkt-Aufhängungssystem |
| **Magnetkreis:** | Ganzlamellenkern |
| **Frequenzgang:** | 10 Hz bis 30 kHz<br>20 Hz bis 10 kHz ±1 dB |
| **Ausgangsspannung:** | 2,5 mV bei 1 kHz<br>5 cm/s. Null-zu-Spitze, lateral<br>[7 mV bei 1 kHz 10 cm/s. Null-zu-Spitze, 45° (DIN 45 000)] |
| **Kanaltrennung:** | 22 dB bei 1 kHz |
| **Kanalabweichung:** | Innerhalb 2 dB bei 1 kHz |
| **Empfohlene Endimpedanz:** | 47 kΩ ~ 100 kΩ |
| **Nachgiebigkeit (dynamisch):** | 12 x $10^{-6}$ cm/dyn bei 100 Hz |
| **Auflagekraft-Einstellbereich:** | 1,25 ±0,25 g (12,5 ±2,5 mN) |
| **Gewicht:** | 6,0 g (nur Tonabnehmer) |
| **Ersatznadel:** | EPS-24CS |

Français

## CARACTERISTIQUES

Les spécifications sont susceptibles d'être modifiées sans préavis.
Le poids et les dimensions donnés sont approximatifs.

### ■ Généralités

**Alimentation:** 220 V, 50/60 Hz
**Consommation:** 7 W
**Dimensions:** 31,5 x 8,8 x 31,5 cm
**(L x H x P)** 31,5 x 39 x 31,5 cm
(Hauteur maximum lorsque le dessus (couvercle protège-poussière) est ouvert.)
**Poids:** 3,2 kg

### ■ Platine de lecture

**Type:** Platine automatique
Départ automatique/Entrée automatique
Retour automatique
Arrêt automatique
Auditon répétée
Sélection de vitesse automatique
Sélection automatique du diamètre
Sélection de vitesse manuelle possible
Détection de la présence d'un disque
**Système d'entrainement:** Entraînement par courroie
**Moteur:** Moteur C.C.
**Système de commande d'entraînement:** Servocommande C.C.
**Plateau de lecture:** Aluminium moulé sous pression
Diamètre 30 cm
**Vitesses de la platine:** 33-1/3 et 45 t/p.m.
Sélecteur de vitesse automatique
(Sélection manuelle possible)
**Pleurage et scientillement:** 0.045% de valeur efficace
(JIS C5521)
±0.06% de crête
(IEC 98A Pondéré)
**Ronflement:** –70 dB (IEC 98A Pondéré)

### ■ Bras de lecture

**Type:** Bras de lecture d'alignement linéaire de type à équilibre dynamique avec suspension à la cardan à 4 pivots
**Longueur effective:** 105 mm
**Angle d'erreur de piste:** En deçá de ±0,1°
**Masse réelle:** 9 g (y compris la cellule pick-up)
**Fréquence de résonance:** 12 Hz
**Moteur d'entraînement du bras de lecture:** Moteur C.C.

### ■ Cellule pick-up

**Type:** Cellule pick-up stéréo à aimant mobile
**Circuit magnétique:** Noyau entièrement feuilleté
**Réponse en fréquence:** 10 Hz à 30 kHz
20 Hz à 10 kHz ±1 dB
**Tension de sortie:** 2,5 mV à 1 kHz; 5 cm/s., zérp à vitesse latèrale de crête
(7 mV 1 kHz; 10 cm/s., zéro à vitesse 45° de crête
[DIN 45 000 ] )
**Séparation des canaux:** 22 dB à 1 kHz
**Equilibrage des canaux:** En deçà de 2 dB à 1 kHz
**Impédance de charge recommandée:** 47 kΩ ~ 100 kΩ
**Elasticité (dynamique):** 12 x $10^{-6}$ cm/dyne à 100 Hz
**Plage de la force verticale d'appui:** 1,25 ±0,25 g (12,5 ±2,5 mN)
**Poids:** 6,0 g (cellule seule)
**Remplacement de la pointe de lecture:** EPS-24CS

Español

## ESPECIFICACIONES

Las especificaciones quedan sujetas a cambios sin aviso previo.
Los peso y las dimensiones indicados son aproximados.

### ■ En general

**Alimentación de corriente:** 220 V, 50/60 Hz
**Consumo de corriente:** 7 W
**Dimensiones:** 31,5 x 8,8 x 31,5 cm
**(Ancho x Alto x Prot.)** 31,5 x 39 x 31,5 cm
(Altura máxima cuando la parte de arriba (tapa contra el polvo) está abierta.)
**Peso:** 3,2 kg

### ■ Sección del plato giratorio

**Tipo:** Plato giratorio automático
Arranque automático/Descenso automático
Retorno automático
Parada automática
Ejecución repetida
Selección automática de la velocidad
Es posible seleccionar la velocidad a mano
Selección automática del tamaño
Detección de presencia de disco
**Método de accionamiento:** Accionamiento por correa
**Motor:** Motor de corriente continua
**Método de control de accionamiento:** Servocontrol de corriente continua
**Platillo del plato giratorio:** Aluminio fundido
30 cm de diámetro
**Velocidades del plato giratorio:** 33-1/3 y 45 rpm
Selección automática de la velocidad
(También posibilidad de seleccionar a mano)
**Ululaciones y trémolo:** 0,045% WRMS (JIS C5521)
±0,06% cresta
(IEC 98A Ponderado)
**Ruido de rodadura:** –70 dB (IEC 98A Ponderado)

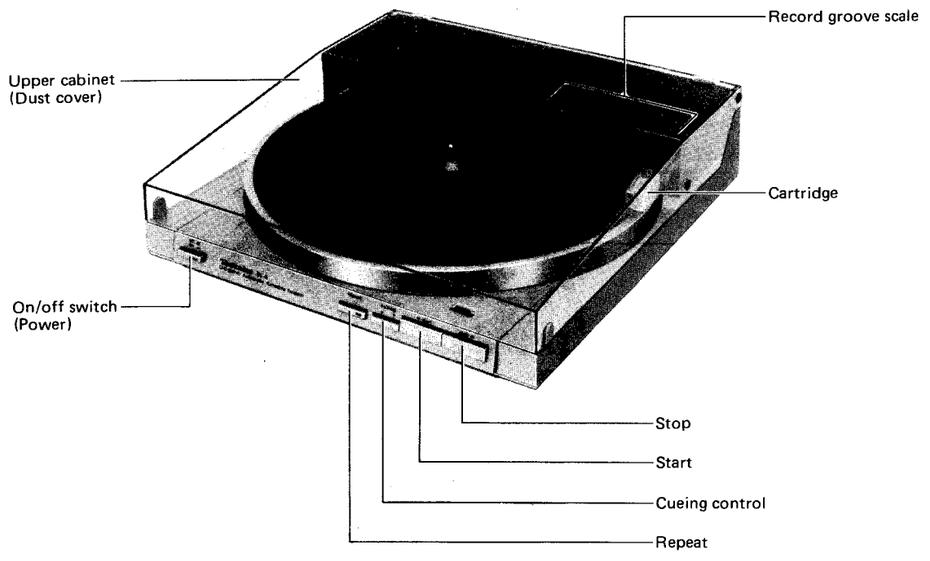
### ■ Sección del brazo sonoro

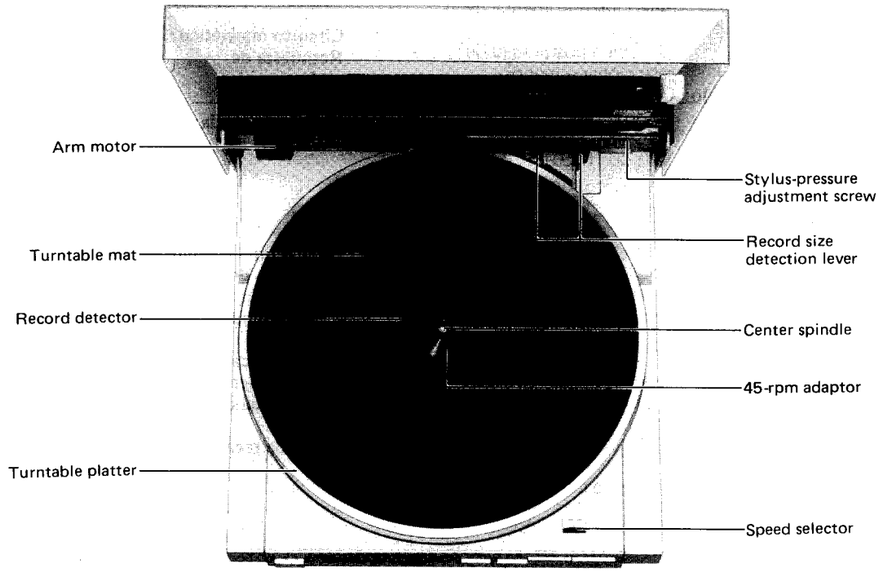
**Tipo:** Brazo sonoro de seguimiento lineal de tipo con equilibrio dinámico con suspensión cardánica de 4 pivotes
**Longitud efectiva:** 10,5 cm
**Angulo de error de seguimiento:** Inferior a ±0,1° aproxim.
**Masa efectiva:** 9 g (incluyendo el cartucho)
**Frecuencia de resonancia:** 12 Hz
**Motor de accionamiento del brazo sonoro:** Motor de corriente continua

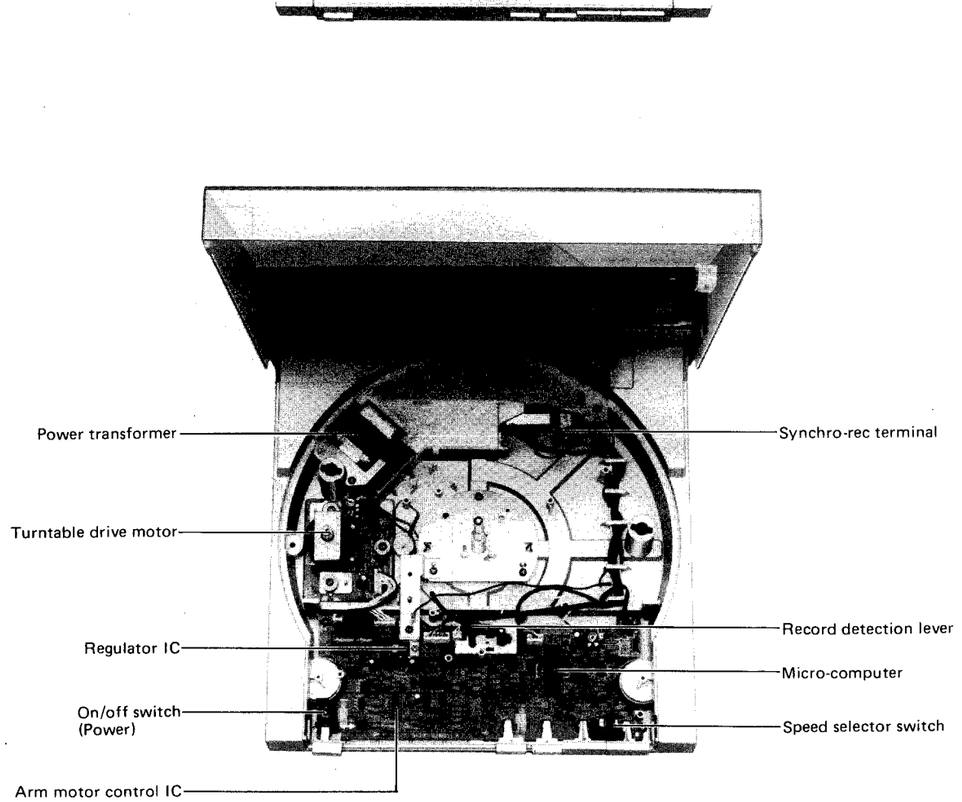
### ■ Sección del cartucho

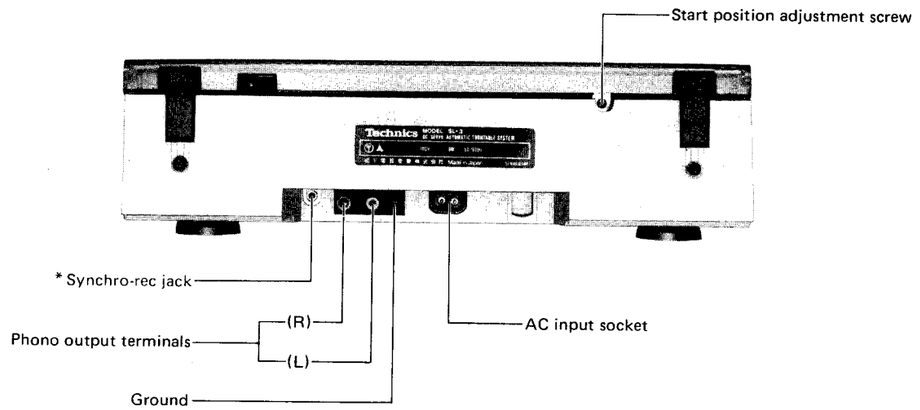
**Tipo:** Cartucho estereofónico de imán móvil
**Circuito magnético:** Núcleo totalmente laminado
**Respuesta de frecuencia:** 10 Hz a 30 kHz
20 Hz a 10 kHz ±1 dB
**Voltaje de salida:** 2,5 mV a 1 kHz
Velocidad lateral de cero a cresta de 5 cm/s.
(7 mV a 1 kHz. Velocidad de 45° de cero a cresta de 10 cm/s [DIN 45 000] )
**Separación de canales:** 22 dB a 1 kHz
**Equilibrio de canales:** Inferior a 2 dB a 1 kHz
**Impedancia de carga recomendada:** 47 kΩ a 100 kΩ
**Elasticidad (dinámica):** 12 x $10^{-6}$ cm/dina a 100 Hz
**Radio de presión de la aguja:** 1,25 ±0,25 g (12,5 ±2,5 mN)
**Peso:** 6 g (cartucho solamente)
**Aguja de recambio:** EPS-24CS

## ■ LOCATION OF CONTROLS

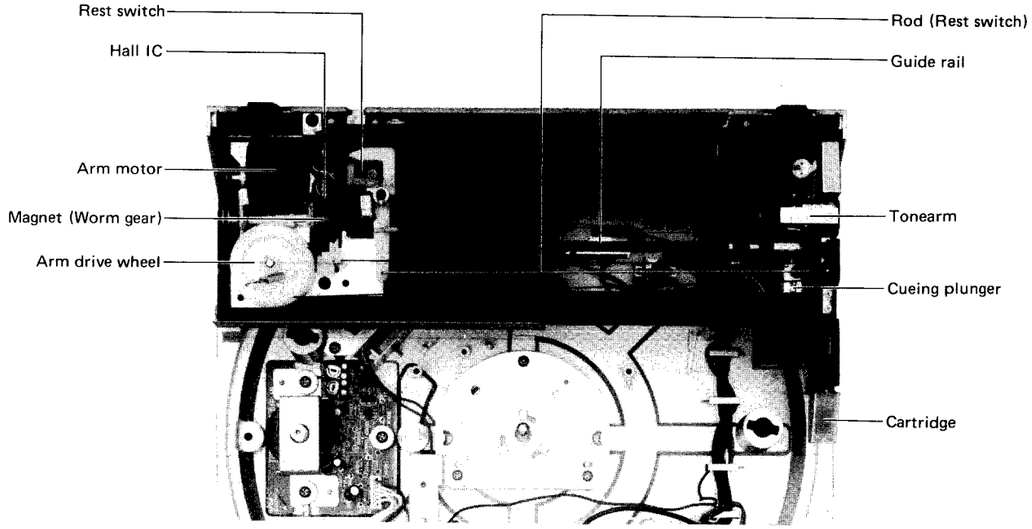





*** Synchro-rec. jack (Synchro-rec jack is not available)**



# ■ DISASSEMBLY INSTRUCTIONS

## • How to remove the cartridge

1. Open the upper cabinet.
2. Completely loosen the cartridge setscrew and pull out the cartridge. **(Fig. 2)**

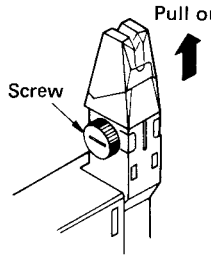



Fig. 2

## • How to remove the turntable platter

1. Open the upper cabinet.
2. Remove the turntable mat, turn the 45 adaptor counter-clockwise to raise it from the turntable platter surface.
3. Remove the 45 adaptor. **(Fig. 3)**
4. Remote the stopper ring from the center spindle. **(Fig. 4)**
5. Remove the belt and lift the turntable platter.

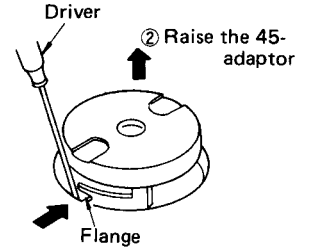



Fig. 3

## ★ To mount the turntable platter . . . . .

1. Put the turntable platter in place, and fit the stopper ring onto the center spindle.
2. Put on the spring and fit in the 45 adaptor.
   **Note:** Align the arrow ⇨ on the back of 45 adaptor to the arrow ⇦ on the turntable platter. **(Fig. 5)**
3. Set the belt over the capstan and put on the turntable mat.

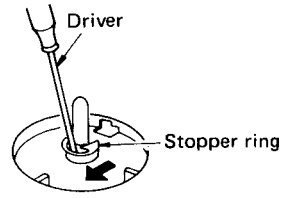



Fig. 4

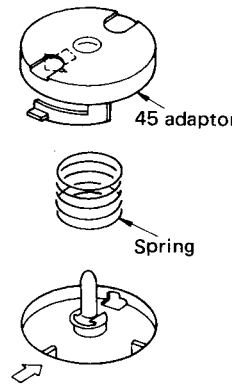



Fig. 5

## • How to remove the control knob cover.

1. Remove the turntable platter. **(Refer to "How to remove the turntable platter".)**
2. Remove the 4 setscrews **(Fig. 6: ❶ ~ ❹)** of the cover.
3. Remove the lead wires from the claws. **(Fig. 6)**
4. Release the 4 claws of the cover from the main cabinet. **(Fig. 6, 7)**
5. Remove the cover in the direction of arrow Ⓐ. **(Fig. 6)**

**Note:** When installing the control knob cover, set the speed selector switch to "auto" position and then reversely follow the procedures 1 ~ 5.

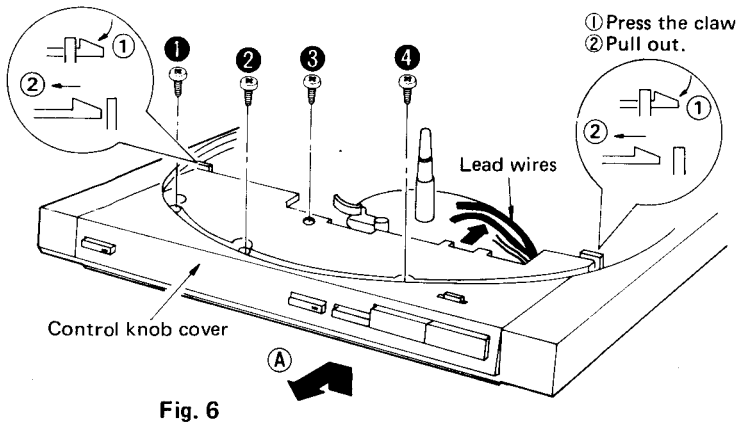



Fig. 6

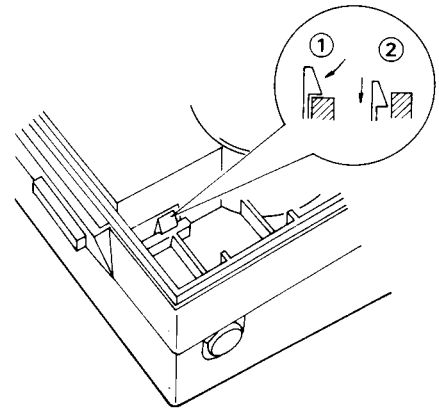



Fig. 7

## • How to remove the main circuit P.C.B.

(Micro-computer, arm control and constant voltage circuit)

1. Remove the control knob cover. **(Refer to "How to remove the control knob cover.")**
2. Remove the 5 setscrews **(Fig. 8: ❺ ~ ❾)** of P.C.B. and 2 setscrews **(Fig. 8: ❿, ⓫)** of radiator panel.

**Note:** For P.C.B. setscrews (❺ ~ ❾), is printed on the P.C.B.

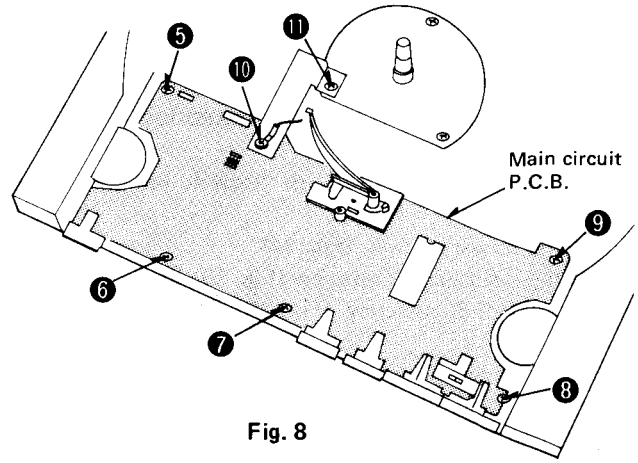
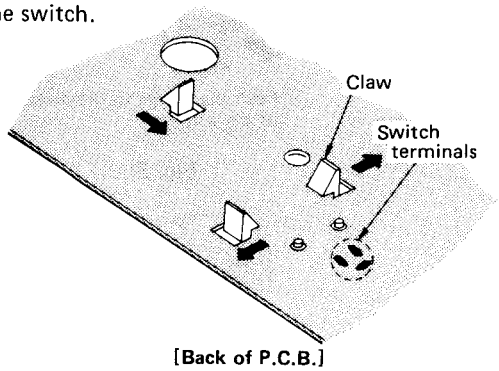



Fig. 8

## • How to remove the record detection switch

1. Remove the turntable platter. **(Refer to "How to remove the turntable platter".)**
2. Remove the main circuit P.C.B. **(Refer to "How to remove the main circuit P.C.B.")**
3. Remove the switch cover from the P.C.B. **(Fig. 9)**
4. Remove solder from the switch terminals and remove the switch.




**[Back of P.C.B.]**

Push the cover claws in the directions of the arrows, then remove the cover from the P.C.B.

**Fig. 9**

## • How to remove the record size detecting switch

1. Remove the turntable platter. **(Refer to "How to remove the turntable platter.")**
2. Remove the switch cover setscrew **(Fig. 11 : ⑮ )** and lift the cover in the direction of the arrow and then remove the synchro-rec jack frome the cover.
3. Pull the switch cover out of the cabinet, then turn over the switch cover and remove the switch setscrew **(Fig. 12 : ⑯ ).**

**Note:** When setting the switch cover, take care not to squeeze the lead wire with the cabinet.

## • How to remove the dust cover.

1. Remove the right and left rivets of the dust cover. **(Fig. 13)**
2. Lift the dust cover.

## • How to remove the tonearm.

1. Remove the dust cover. **(Refer to "How to remove the dust cover.")**
2. Remove the tonearm cover. **(Fig. 14)**
3. Turn the worm gear by hand to move the tonearm a little inward.
4. Remove the tonearm setscrew **(Fig. 15: ⑰).**
5. Remove solder from the output lead wires and disconnect the wires, then remove the tonearm in the direction of the arrow. **(Fig. 15)**

## • How to remove the offset angle detection circuit P.C.B.

1. Remove the dust cover. **(Refer to "How to remove the dust cover.")**
2. Remove the tonearm cover. **(Fig. 14)**
3. Remove the needle cover setscrew **(Fig. 15: ⑱).**
4. Loosen the P.C.B. setscrew **(Fig. 15: ⑲)** and lift the P.C.B.

**Note:** After removing the P.C.B., be sure to adjust the servo gain and offset voltage.

8 **(Refer to the adjustment procedure on Page 11.)**

## • How to remove the drive circuit P.C.B.

1. Remove the turntable platter. **(Refer to "How to remove the turntable platter.")**
2. Remove the 3 setscrews **(Fig. 10: ⑫ ~ ⑭)** of P.C.B.

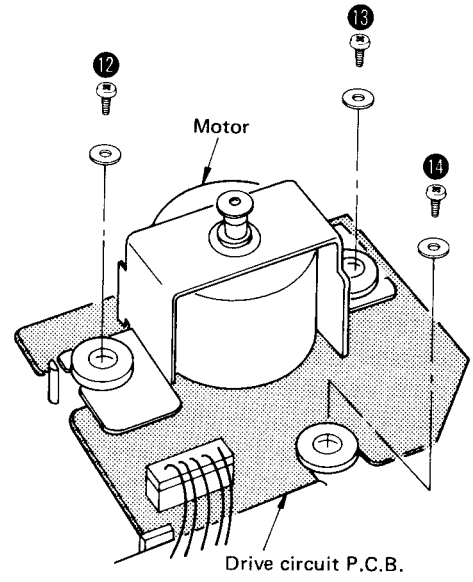



**Fig. 10**

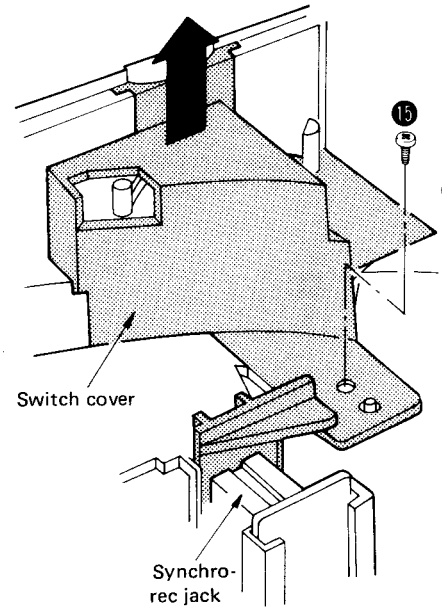



**Fig. 11**

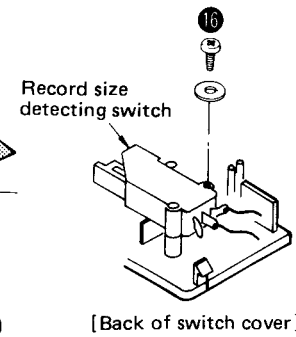



**Fig. 12**

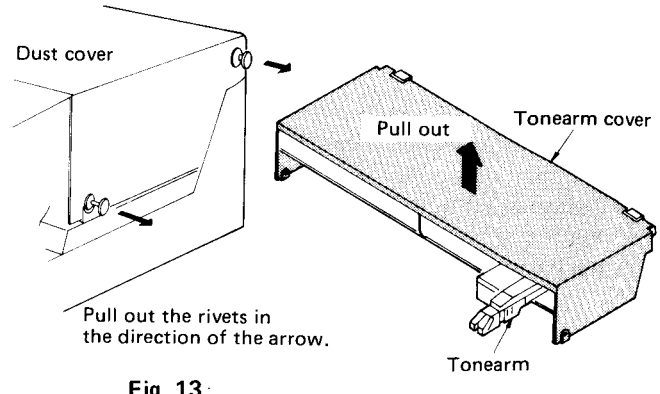
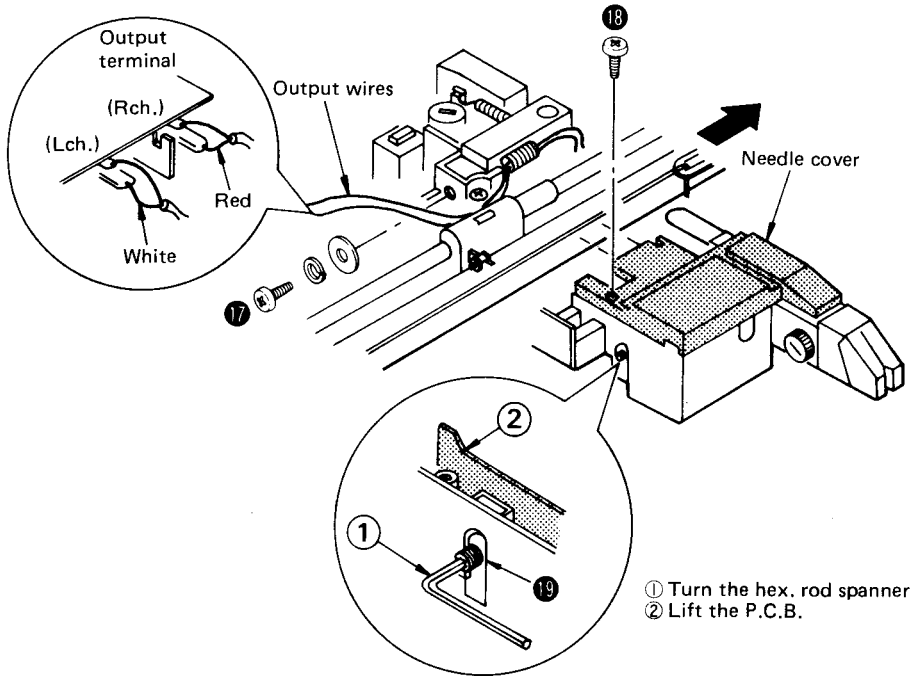



**Fig. 13**

**Fig. 14**




① Turn the hex. rod spanner (M3) counterclockwise.
② Lift the P.C.B.

**Fig. 15**

## • How to remove the cueing plunger

1. Remove the dust cover. **(Refer to "How to remove the dust cover".)**
2. Remove the tonearm cover. **(Fig. 14)**
3. Remove the plunger setscrew **(Fig. 16: ⑳).**
4. Remove the offset angle detection P.C.B. and unsolder the 2 lead wires of plunger, then the plunger can be removed.

**Note:** The plunger must be fitted in the position of Fig. 17.

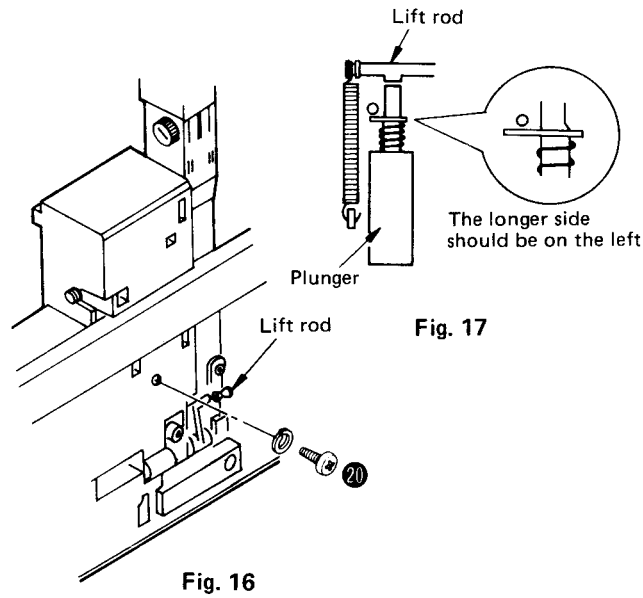



**Fig. 17**

**Fig. 16**

## • How to remove the arm position detecting circuit P.C.B.

1. Remove the dust cover. **(Refer to "How to remove the dust cover.")**
2. Remove the tonearm cover. **(Fig. 14)**
3. Remove the P.C.B. setscrew **(Fig. 18: ㉒).**

**Note:** Clearance between Hall IC and magnet should be 0.8mm ± 0.2mm. Adjust it as in Fig. 19.

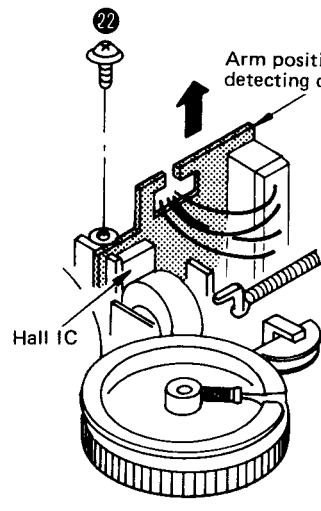
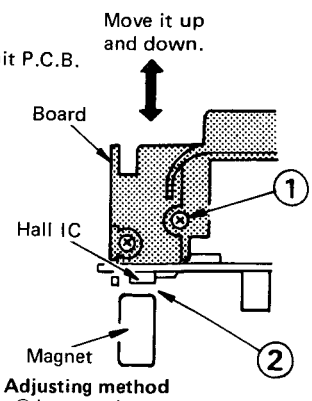



**Fig. 18**




**Adjusting method**
① Loosen the screw.
② Move the board so that the clearance between Hall IC and magnet is 0.8mm ± 0.2mm, and then tighten the screw.

**Fig. 19**

## ■ HOW TO SET THE TONEARM DRIVE ROPE

When setting the rope, follow the procedure given below.

1. Remove the dust cover and tonearm cover. **(Refer to "How to remove the dust cover.")**
2. Remove the roller cover. **(Fig. 20)**
3. Set the rope in the order of 1 ~ 5. **(Fig. 20)**
4. Fit the rope connector to the tonearm.
5. Set the roller cover and turn the worm gear by hand to see that the tonearm moves.

**Note:** The arm drive wheel is not fixed. So, take care not to let is come loose during servicing. (Stop it with C-ring to prevent its removal.)

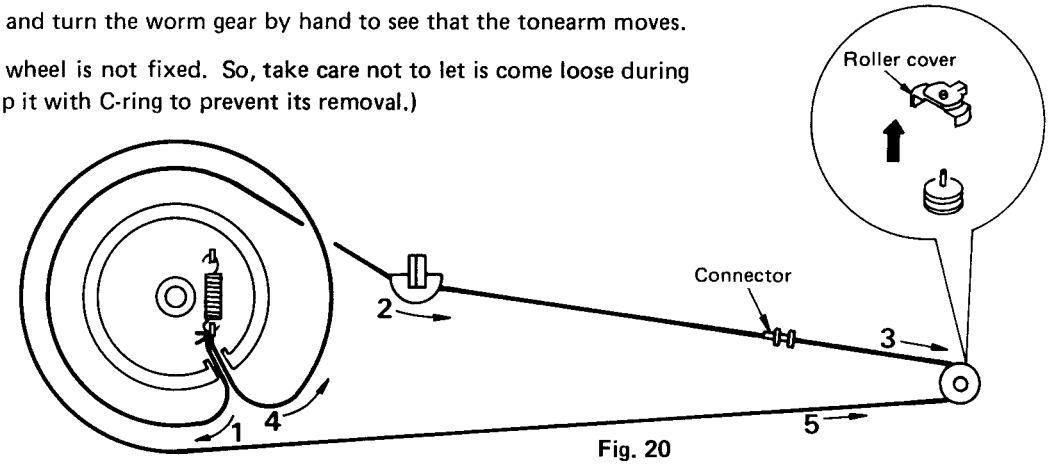



Fig. 20

## ■ MEASUREMENTS AND ADJUSTMENT ■■■■■■■■■■ English ■■■■■■■■■■

### • Instruments used

1. Oscilloscope
2. DC voltmeter
3. 30cm record
4. Screwdriver
5. Hex. wrench (M3)

### • Cautions

1. To adjust servo gain and offset voltage . . . . . **(Refer to "How to remove parts")**
   1) Remove the dust cover and tonearm cover.
   2) Remove the turntable platter and control knob cover.
   3) Disassemble the tonearm as in Fig. 21.
2. To adjust clock frequency . . . . .
   1) Remove the turntable platter and control knob cover.

| Step | Item | Preparations | Parts adjusted | Procedure |
|---|---|---|---|---|
| 1 | Start position | 1) Put 30 cm record on turntable mat and close upper cabinet.<br>2) Set power switch to "on".<br>3) Push start button switch. | Start position adjust screw. (Fig. 22) | 1) If stylus drops between tunes, turn adjust screw counterclockwise.<br>2) If stylus drops outside record disc, turn adjust screw clockwise. |
| 2 | Tonearm offset angle | 1) Open upper cabinet.<br>2) Set power switch to "on".<br>3) Push start button to move tonearm inside, then set power switch to "off". | Offset angle adjust screw. (Fig. 23) | 1) Turn offset angle adjust screw so that tonearm center is aligned to V-groove of lift rod. |
| 3 | Servo gain | 1) Connect DC voltmeter to CN303 terminal 3 (+) and 2 (−) of main circuit P.C.B. (Fig. 24)<br>2) Set power switch to "on". | VR501 (Fig. 21) | 1) Completely shift tonearm to the right.<br>2) Adjust VR501 so that output voltage is 3.6V. |
| 4 | Offset voltage | 1) Connect DC voltmeter to CN303 terminal 3 (+) and 2 (−) of main circuit P.C.B. (Fig. 24)<br>2) Set power switch to "on". | Offset voltage adjust screw. (Fig. 21) | 1) Set tonearm to center.<br>2) Turn adjust screw so that output voltage is 1.8V. (Use hexagonal wrench.) |
| 5 | Clock frequency | 1) Connect lead wire with clip to IC301 pin 7 and pin 27 of main circuit P.C.B.<br>2) Connect oscilloscope to IC301 pin 6 . (Fig. 24) | VR301 (Fig. 24) | 1) Set power switch to "on".<br>2) Adjust VR301 so that the cycle output waveform is 30$\mu$F ± 1$\mu$s. |
| 6 | Rotating speed | 1) Open upper cabinet and set speed selector switch to "33".<br>2) Set power switch to "on" and push start button. | VR101 33 r.p.m. (Fig. 25) | 1) Adjust VR101 to obtain rated speed. |
| | | 1) Open upper cabinet and set speed selector switch to "45".<br>2) Set power switch to "on" and push start button. | VR102 45 r.p.m. (Fig. 25) | 1) Adjust VR102 to obtain rated speed. |

## ■ ADJUSTMENT POINTS

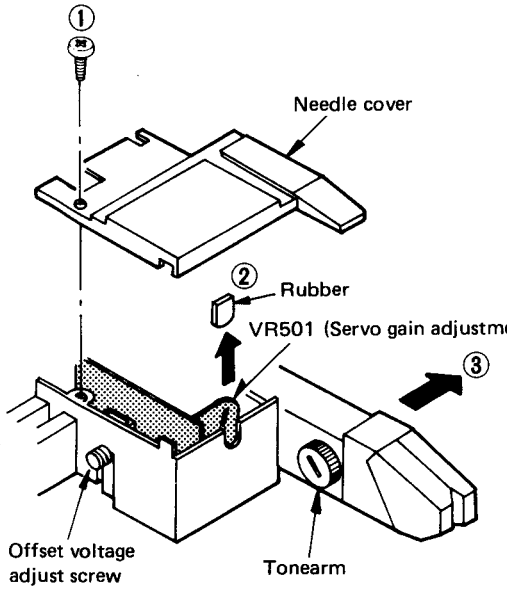



Fig. 21
(Abb. 21)

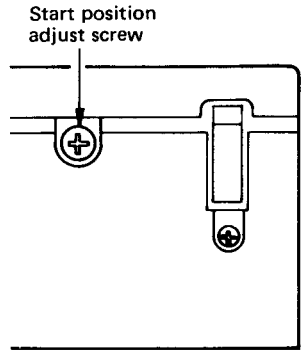



Fig. 22
(Abb. 22)

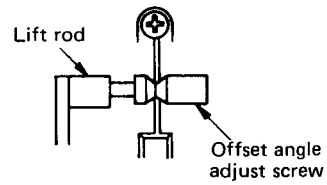



Fig. 23
(Abb. 23)

① Remove the needle cover.
② Remove the rubber.
③ When adjusting the servo gain, set the tonearm in the direction of the arrow.

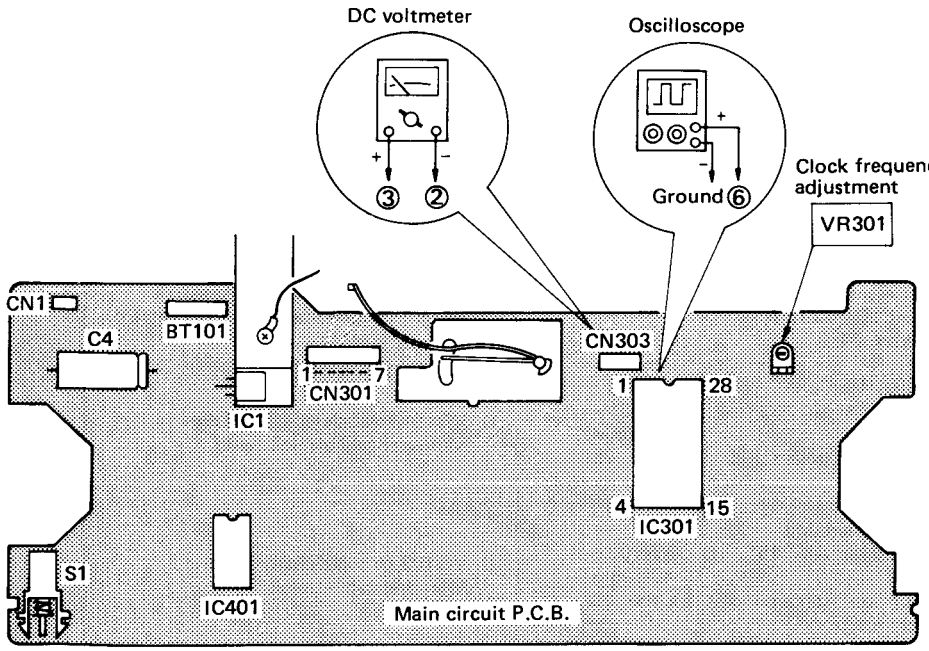



Fig. 24
(Abb. 24)

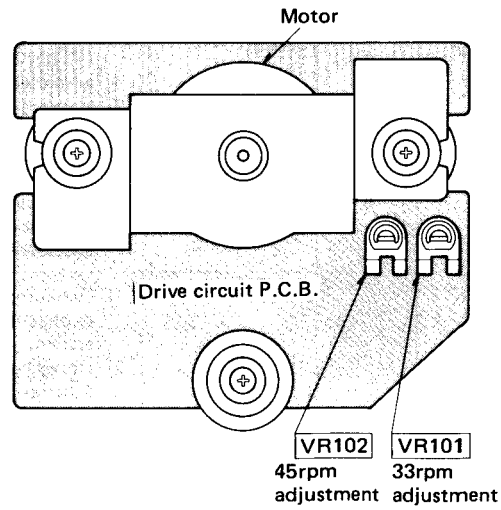



Fig. 25
(Abb. 25)

## ■ MESSUNGEN UND JUSTIERUNGEN — Deutsch

- **Zu verwendende Instrumente**

1. Oszilloskop
2. Gleichstrommeter
3. 30cm-Schallplatte
4. Schraubendreher
5. Sechkantschlüssel (M3)

- **Achtung**

1. Zur Justierung der Servoverstärkung und Offsetspannung . . . . .
   **(Siehe "Ausbauen von Teilen")**
   1) Die Staubabdeckung und die Tonarmabdeckung entfernen.
   2) Den Plattenteller und die Reglerknopf-Abdeckung entfernen.
   3) Den Tonarm auseinandernehmen, wie in Abb. 21 gezeigt.
2. Zur Justierung der Taktgeberfrequenz . . . . .
   1) Den Plattenteller und die Reglerknopf-Abdeckung entfernen.

| Schritt | Posten | Vorbereitung | Zu justierende Teile | Vorgehen |
|---|---|---|---|---|
| 1 | **Start-Position** | 1) 30cm-Platte auflegen und Plattenspieler-Gehäuseoberteil schließen.<br>2) Netzschalter auf "on" stellen.<br>3) Start-Taste drücken. | Startposition-Justierschraube (Abb. 22) | 1) Falls Nadel im Musikstück aufsetzt, entgegen dem Uhrzeigersinn drehen.<br>2) Falls Nadel au erhalb der Platte aufsetzt, Justierschraube im Uhrzeigersinn drehen. |
| 2 | **Tonarmwinkel** | 1) Gehäuseoberteil öffnen.<br>2) Netzschalter auf "on" stellen.<br>3) Start-Taste drücken, um Tonarm nach innen zu bewegen; dann Netzschalter auf "off" stellen. | Spurfehlwinkel-Justierschraube (Abb. 23) | 1) Spurfehlwinkel-Justierschraube drehen, bis die Tonarmmitte mit der V-Kerbe der Liftstange übereinstimmt. |
| 3 | **Servo-Verstärkung** | 1) Gleichstrom-Voltmeter an CN303, Anschluß 3 (+) und 2 (−) der Hauptleiterplatte anschließen. (Abb. 24)<br>2) Netzschalter auf "on" stellen. | VR501 (Abb. 21) | 1) Tonarm ganz nach rechts bewegen.<br>2) VR501 so abgleichen, daß die Ausgangsspannung 3,6V beträgt. |
| 4 | **Offset-Spannung** | 1) Gleichstrom-Voltmeter an CN303, Anschluß 3 (+) und Anschluß 2 (−) der Hauptleiterplatte anschließen. (Abb. 24)<br>2) Netzschalter auf "on" stellen. | Offsetspannungs-Justierschraube (Abb. 21) | 1) Tonarm in die Mitte stellen.<br>2) Justierschraube so einstellen, daß Ausgangsspannung 1,8V beträgt. (Sechskantschlüssel verwenden.) |
| 5 | **Taktgeber-frequenz** | 1) Anschlußdraht mit Klemmen an IC301, Stift 7 und Stift 27 der Hauptleiterplatte anschließen.<br>2) Oszilloskop an IC301, Stift 6 anschließen. (Abb. 24) | VR301 (Abb. 24) | 1) Netzschalter auf "on" stellen.<br>2) VR301 so justieren, daß Ausgangswellenformperiode 30$\mu$s ± 1$\mu$s beträgt. |
| 6 | **Drehzahl** | 1) Gehäuseoberteil öffnen und Drehzahl-Wahlschalter auf "33" stellen.<br>2) Netzschalter auf "on" stellen und Starttaste drücken. | VR101 33U/min. (Abb. 25) | 1) VR101 so abgleichen, daß die Nenndrehzahl erreicht wird. |
| | | 1) Gehäuseoberteil öffnen und Drehzahl-Wahlschalter auf "45" stellen.<br>2) Netzschalter auf "on" stellen und Starttaste drücken. | VR102 45U/min. (Abb. 25) | 1) VR102 so abgleichen, daß die Nenndrehzahl erreicht wird. |

## ■ MESURAGES ET RÉGLAGES — Français

- **Instruments et appareils utilisés**

1. Oscilloscope
2. Voltmètre à C.C.
3. Disque de 30 cm
4. Tournevis
5. Clef hexagonale (M3)

- **Précautions**

1. Pour régler l'amplification servo-mécanique et la tension de suppression . . . . . **(Se référer à "Comment retirer les éléments".)**
   1) Retirer le couvercle protège-poussière et la coiffe du bras de lecture.
   2) Retirer la platine et la coiffe du bouton de réglage.
   3) Démonter le bras de lecture comme il est montré à la Fig. 21.
2. Pour régler la fréquence des impulsions de rythme . . . . .
   1) Retirer la platine et la coiffe du bouton de réglage.

| Etape | Article | Préparatifs | Eléments à régler | Marche à suivre |
|---|---|---|---|---|
| 1 | **Position de mise en marche** | 1) Placer un disque de 30 cm sur la platine et refermer le boîtier supérieur.<br>2) Régler l'interrupteur d'alimentation sur "on" (marche).<br>3) Appuyer sur l'interrupteur à bouton de mise en marche. | Vis d'ajustement du positionnement de mise en marche. (Fig. 22) | 1) Si la pointe de lecture descend entre les plages du disque, tourner la vis d'ajustement dans le sens inverse des aiguilles d'une montre.<br>2) Si la pointe de lecture descend en dehors du disque d'enregistrement, tourner la vis d'ajustement dans le sens des aiguilles d'une montre. |
| 2 | **Angle de décalage du bras de lecture** | 1) Ouvrir le boîtier supérieur.<br>2) Régler l'interrupteur d'alimentation sur "on" (marche).<br>3) Appuyer sur l'interrupteur à bouton de mise en marche pour faire déplacer le bras de lecture vers l'intérieur, puis régler l'interrupteur d'alimentation sur "off" (hors circuit). | Vis d'ajustement de l'angle de décalage. (Fig. 23) | 1) Tourner la vis d'ajustement de l'angle de décalage de telle sorte que le centre du bras de lecture soit aligné sur la rayure en V de la tige d'élévation. |
| 3 | **Amplification servo-mécanique** | 1) Brancher un voltmètre à C.C. à la borne 3 (+) et 2 (–) CN303 de la plaquette à circuits imprimés du montage principal. (Fig. 24)<br>2) Régler l'interrupteur d'alimentation sur "on" (marche). | VR501 (Fig. 21) | 1) Faire pivoter entièrement vers la droite le bras de lecture.<br>2) Ajuster VR501 de telle sorte que la tension de sortie soit de 3,6V. |
| 4 | **Tension de suppression** | 1) Brancher un voltmètre à C.C. à la borne 3 (+) et 2 (–) CN303 de la plaquette à circuits imprimés du montage principal. (Fig. 24)<br>2) Régler l'interrupteur d'alimentation sur "on" (marche). | Vis d'ajustement de la tension de suppression. (Fig. 21) | 1) Placer le bras de lecture au milieu.<br>2) Tourner la vis d'ajustement de telle sorte que la tension de sortie soit de 1,8V. (Utiliser la clef hexagonale.) |
| 5 | **Fréquence des impulsions de rythme** | 1) Connecter le fil de jonction à pince à la broche 7 et à la broche 27 IC301 de la plaquette à circuits imprimés du montage principal.<br>2) Brancher un oscilloscope à la broche 6 de IC301. (Fig. 24) | VR301 (Fig. 24) | 1) Régler l'interrupteur d'alimentation sur "on" (marche).<br>2) Ajuster VR301 de telle sorte que la période de forme d'onde de sortie soit de $30\mu \pm 1\mu$s. |
| 6 | **Vitesse de rotation** | 1) Ouvrir le boîtier supérieur et régler le commutateur sélecteur de vitesse sur "33".<br>2) Régler l'interrupteur d'alimentation sur "on" (marche) et appuyer sur le bouton de mise en marche. | VR101 33 t/p.m. (Fig. 25) | 1) Ajuster VR101 pour obtenir une vitesse nominale de rotation. |
| | | 1) Ouvrir le boîtier supérieur et régler le commutateur sélecteur de vitesse sur "45".<br>2) Régler l'interrupteur d'alimentation sur "on" (marche) et appuyer sur le bouton de mise en marche. | VR102 45 t/p.m. (Fig. 25) | 1) Ajuster VR102 pour obtenir une vitesse nominale de rotation. |

## ■ MEDICIONES Y AJUSTE ■ Español

- **Instrumentos usados**

1. Osciloscopio
2. Voltímetro de CC
3. Disco de 30cm
4. Destornillador
5. Llave hex.

- **Precauciones**

1. Ajustar servoganancia y contratensión . . . . . **(Referir a "Cómo remover piezas")**
   1) Remover la tapa contra el polvo y la cubierta de brazo fonocaptor.
   2) Remover la cubierta del plato giradiscos y perilla de control.
   3) Desmontar el brazo fonocaptor como en la Fig. 21.
2. Para ajustar la frecuencia de reloj . . . . .
   1) Remover la cubierta del plato giradiscos y perilla de control.

| Peso | Item | Preparación | Piezas ajustadas | Procedimento |
|---|---|---|---|---|
| 1 | **Posición de arranque** | 1) Poner disco de 30cm sobre plato giradiscos y cerrar el gabinete superior.<br>2) Poner interruptor de corriente en "on".<br>3) Apretar interruptor botón de arranque. | Tornillo de ajuste de posición de arranque (Fig. 22) | 1) Si la aguja cae entre tonadas, girar el tornillo de ajuste a la izquierda.<br>2) Si la agua cae fuera del disco, girar el tornillo de ajuste a la derecha. |
| 2 | **Angulo de fricción de brazo fonocaptor** | 1) Abrir gabinete superior.<br>2) Poner interruptor de corriente en "on".<br>3) Apretar botón de arranque para mover brazo fonocaptor dentro, luego poner interruptor de corriente en "off". | Tornillo de ángulo de fricción (Fig. 23) | 1) Girar tornillo de ajuste de ángulo de fricción de manera que el centro del brazo de fonocaptor esté alineado con ranura-V de varilla de alza. |
| 3 | **Servoganancia** | 1) Conectar voltímetro de CC a terminal CN303 3 (+) y 2 (–) de circuito principal P.C.B. (Fig. 24)<br>2) Poner interruptor de corriente en "on". | VR501 (Fig. 21) | 1) Cambiar completamente el brazo fonocaptor a la derecha.<br>2) Ajustar VR501 de manera que tensión de salida sea 3,6V. |
| 4 | **Contratensión** | 1) Conectar voltímetro de CC a terminal CN303 3 (+) y 2 (–) de circuito principal P.C.B. (Fig. 24)<br>2) Poner interruptor de corriente en "on". | Tornillo de ajuste de ángulo de fricción. (Fig. 21) | 1) Poner brazo de fonocaptor en centro.<br>2) Girar tornillo de ajuste de manera que tensión de salida sea 1,8V. (Usar llave hexagonal.) |
| 5 | **Frecuencia de reloj** | 1) Conectar hilo conductor con mordaza a perno 301 CI (7) y perno (27) de circuito principal P.C.B.<br>2) Conectar osciloscopio a perno 301 CI (6). (Fig. 24) | VR301 (Fig. 24) | 1) Poner interruptor de corriente en "on".<br>2) Ajustar VR301 de manera que periodo de forma de onda de salida sea $30\mu \pm 1\mu$s. |
| 6 | **Velocidad rotativa** | 1) Abrir gabinete superior y poner interruptor selector de velocidad en "33".<br>2) Poner interruptor de corriente en "on" y apretar botón de arranque. | VR101 33 r.p.m. (Fig. 25) | 1) Ajustar VR101 para obtener velocidad nominal. |
| | | 1) Abrir gabinete superior y poner interruptor selector de velocidad en "45".<br>2) Poner interruptor de corriente en "on" y apretar botón de arranque. | VR102 45 r.p.m. (Fig. 25) | 1) Ajustar VR102 para obtener velocidad nominal. |

## ■ RESISTOR AND CAPACITORS

**Notes:**
1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
3. This " **S** " mark is service standard parts and may differ from production parts.
4. Unless otherwise specified. All resistors are in OHMS ( Ω ) K = 1000Ω, M = 1000kΩ All capacitors are in MICROFARADS ($\mu$F) P = $\mu\mu$F
5. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.

**Numbering System of Resistor**

Example

| ERD | 25 | F | J | 101 |
|---|---|---|---|---|
| Type | Wattage | Shape | Tolerance | Value |
| ERG | 1 | AN | J | 2R2 |
| Type | Wattage | Shape | Tolerance | Value |

**Numbering System of Capacitor**

Example

| ECKD | 1H | 102 | Z | F |
|---|---|---|---|---|
| ECKD | Voltage | Value | Tolerance | Peculiarity |
| ECEA | 50 | M | R47 | R |
| Type | Voltage | Peculiarity use | Value | Special use |

| Resistor Type | Wattage | Tolerance |
|---|---|---|
| ERD : Carbon | 25 : 1/4W | J : ±5% |
| ERG : Metal Oxide | 1 : 1W | G : ±2% |

ERD2FCG□□□ ⟶ Fuse type carbon (1/4W)

| Capacitor Type | Voltage: ECEA Type | Voltage: Others | Tolerance |
|---|---|---|---|
| ECEA : Electrolytic | 1A : 10V | 1H : 50V DC | J : ±5% |
| ECEA...N : Non Polar Electrolytic | 1C : 16V | 2H : 500V DC | K : ±10% |
| ECKD : Ceramic | 1E : 25V | | Z : +80%, –20% |
| ECQM : Polyester | 1V : 35V | | P : +100%, –0% |
| ECEB : Electrolytic | 1H : 50V | | M : ±20% |
| ECCD : Ceramic | 50 : 50V | | |

| Ref. No. | P |
|---|---|
| RESISTORS | |
| RF1 | ⚠ ERD2F |
| R1 | S ERD25 |
| R2 | S ERD25 |
| R3 | S ERG1A |
| R101 | S ERD25 |
| R102 | S ERD25 |
| R103 | S ERD25 |
| R104 | S ERD25 |
| R105,106 | S ERD25 |
| R107 | S ERD25 |
| R301 | S ERD25 |
| R302,303 | S ERD25 |
| R304,305 | S ERD25 |
| R306 | S ERD25 |
| R308 | S ERD25 |
| R310 | S ERD25 |
| R313,314 | S ERD25 |
| R315,316 | S ERD25 |

## ■ TERMI

* These are th
be partially

| No. | Mark |
|---|---|
| 1 | VSS |
| 2 | CO9 |
| 3 | CO8 |
| 4 | CO7 |
| 5 | CO6 |
| 6 | CO5 |
| 7 | A13 |
| 8 | A12 |
| 9 | A11 |
| 10 | A10 |
| 11 | B13 |
| 12 | B12 |
| 13 | B11 |
| 14 | B10 |

à suivre

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e montre.
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d'enregistrement,
justement dans le
d'une montre.

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lecture.
le telle sorte que la
soit de 3,6V.

lecture au milieu.
ajustement de telle
on de sortie soit

exagonale.)

teur d'alimentation
).
e telle sorte que la
d'onde de sortie
s.

our obtenir une
de rotation.

remover piezas")
aptor.

mento

re tonadas, girar el
a la izquierda.
a del disco, girar el
a la derecha.

| Peso | Item | Preparación | Piezas ajustadas | Procedimento |
|---|---|---|---|---|
| 2 | **Angulo de fricción de brazo fonocaptor** | 1) Abrir gabinete superior.<br>2) Poner interruptor de corriente en "on".<br>3) Apretar botón de arranque para mover brazo fonocaptor dentro, luego poner interruptor de corriente en "off". | Tornillo de ángulo de fricción (Fig. 23) | 1) Girar tornillo de ajuste de ángulo de fricción de manera que el centro del brazo de fonocaptor esté alineado con ranura-V de varilla de alza. |
| 3 | **Servoganancia** | 1) Conectar voltímetro de CC a terminal CN303 3 (+) y 2 (–) de circuito principal P.C.B. (Fig. 24)<br>2) Poner interruptor de corriente en "on". | VR501 (Fig. 21) | 1) Cambiar completamente el brazo fonocaptor a la derecha.<br>2) Ajustar VR501 de manera que tensión de salida sea 3,6V. |
| 4 | **Contratensión** | 1) Conectar voltímetro de CC a terminal CN303 3 (+) y 2 (–) de circuito principal P.C.B. (Fig. 24)<br>2) Poner interruptor de corriente en "on". | Tornillo de ajuste de ángulo de fricción. (Fig. 21) | 1) Poner brazo de fonocaptor en centro.<br>2) Girar tornillo de ajuste de manera que tensión de salida sea 1,8V. (Usar llave hexagonal.) |
| 5 | **Frecuencia de reloj** | 1) Conectar hilo conductor con mordaza a perno 301 CI (7) y perno (27) de circuito principal P.C.B.<br>2) Conectar osciloscopio a perno 301 CI (6). (Fig. 24) | VR301 (Fig. 24) | 1) Poner interruptor de corriente en "on".<br>2) Ajustar VR301 de manera que periodo de forma de onda de salida sea 30$\mu$ ± 1$\mu$s. |
| 6 | **Velocidad rotativa** | 1) Abrir gabinete superior y poner interruptor selector de velocidad en "33".<br>2) Poner interruptor de corriente en "on" y apretar botón de arranque. | VR101 33 r.p.m. (Fig. 25) | 1) Ajustar VR101 para obtener velocidad nominal. |
| | | 1) Abrir gabinete superior y poner interruptor selector de velocidad en "45".<br>2) Poner interruptor de corriente en "on" y apretar botón de arranque. | VR102 45 r.p.m. (Fig. 25) | 1) Ajustar VR102 para obtener velocidad nominal. |

## ■ RESISTOR AND CAPACITORS

**Notes:** 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
3. This " **S** " mark is service standard parts and may differ from production parts.
4. Unless otherwise specified. All resistors are in OHMS ( Ω ) K = 1000Ω, M = 1000kΩ All capacitors are in MICROFARADS ($\mu$F) P = $\mu\mu$F
5. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.

### Numbering System of Resistor

Example

| ERD | 25 | F | J | 101 |
|---|---|---|---|---|
| Type | Wattage | Shape | Tolerance | Value |

| ERG | 1 | AN | J | 2R2 |
|---|---|---|---|---|
| Type | Wattage | Shape | Tolerance | Value |

| Resistor Type | Wattage | Tolerance |
|---|---|---|
| ERD : Carbon | 25 : 1/4W | J : ±5% |
| ERG : Metal Oxide | 1 : 1W | G : ±2% |

ERD2FCG□□□ ⟶ Fuse type carbon (1/4W)

### Numbering System of Capacitor

Example

| ECKD | 1H | 102 | Z | F |
|---|---|---|---|---|
| ECKD | Voltage | Value | Tolerance | Peculiarity |

| ECEA | 50 | M | R47 | R |
|---|---|---|---|---|
| Type | Voltage | Peculiarity use | Value | Special use |

| Capacitor Type | Voltage | | Tolerance |
|---|---|---|---|
| | ECEA Type | Others | |
| ECEA : Electrolytic | 1A : 10V | 1H : 50V DC | J : ±5% |
| ECEA...N : Non Polar Electrolytic | 1C : 16V | 2H : 500V DC | K : ±10% |
| ECKD : Ceramic | 1E : 25V | | Z : +80%, –20% |
| ECQM : Polyester | 1V : 35V | | P : +100%, –0% |
| ECEB : Electrolytic | 1H : 50V | | M : ±20% |
| ECCD : Ceramic | 50 : 50V | | |

| Ref. No. | | Part No. | Value |
|---|---|---|---|
| RESISTORS | | | |
| RF1 | ⚠ | ERD2FCG180 | 18 |
| R1 | S | ERD25FJ681 | 680 |
| R2 | S | ERD25FJ221 | 220 |
| R3 | S | ERG1ANJ390 | 39 |
| R101 | S | ERD25FJ152 | 1.5K |
| R102 | S | ERD25FJ472 | 4.7K |
| R103 | S | ERD25FJ821 | 820 |
| R104 | S | ERD25FJ681 | 680 |
| R105,106 | S | ERD25FJ103 | 10K |
| R107 | S | ERD25TJ473 | 47K |
| R301 | S | ERD25TJ273 | 27K |
| R302,303 | S | ERD25FJ102 | 1K |
| R304,305 | S | ERD25FJ102 | 1K |
| R306 | S | ERD25FJ471 | 470 |
| R308 | S | ERD25FJ331 | 330 |
| R310 | S | ERD25FJ562 | 560 |
| R313,314 | S | ERD25TJ333 | 33K |
| R315,316 | S | ERD25TJ333 | 33K |

| Ref. No. | | Part No. | Value |
|---|---|---|---|
| RESISTORS | | | |
| R317 | S | ERD25FJ102 | 1K |
| R318,319 | S | ERD25FJ332 | 3.3K |
| R320 | S | ERD25FJ272 | 2.7K |
| R321,322 | S | ERD25FJ331 | 330 |
| R323 | S | ERD25FJ562 | 5.6K |
| R324 | S | ERD25TJ223 | 22K |
| R325 | S | ERD25FJ103 | 10K |
| R326 | S | ERD25FJ272 | 2.7K |
| R331 | S | ERD25FJ102 | 1K |
| R332 | S | ERD25FJ562 | 5.6K |
| R334 | S | ERD25FJ222 | 2.2K |
| R335 | S | ERD25FJ332 | 3.3K |
| R336 | S | ERD25FJ562 | 5.6K |
| R337 | S | ERD25FJ472 | 4.7K |
| R338 | S | ERD25FJ471 | 470 |
| R339 | S | ERD25FJ472 | 4.7K |
| R340 | S | ERD25TJ153 | 15K |
| R341,342 | S | ERD25FJ332 | 3.3K |
| R343 | S | ERD25FJ332 | 3.3K |

| Ref. No. | | Part No. | Value |
|---|---|---|---|
| RESISTORS | | | |
| R345 | S | ERD25FJ472 | 4.7K |
| R347 | S | ERD25FJ102 | 1K |
| R348 | S | ERD25FJ471 | 470 |
| R349 | S | ERD25FJ102 | 1K |
| R401,402 | S | ERD25TJ683 | 68K |
| R403 | S | ERD25FJ472 | 4.7K |
| R404 | S | ERD25FJ122 | 1.2K |
| R405 | S | ERD25FJ222 | 2.2K |
| R406 | S | ERD25FJ102 | 1K |
| R407 | S | ERD25TJ224 | 220K |
| R408 | S | ERD25FJ222 | 2.2K |
| R409 | S | ERD25FJ102 | 1K |
| R410 | S | ERD25TJ224 | 220K |
| R411 | S | ERD25FJ272 | 2.7K |
| R412 | S | ERD25FJ681 | 680 |
| R413,414 | S | ERD25FJ101 | 100 |
| R415,416 | S | ERD25FJ471 | 470 |
| R501 | S | ERD25FJ391 | 390 |
| R502 | S | ERD25FJ681 | 680 |

| Ref. No. | | Part No. | Value |
|---|---|---|---|
| CAPACITORS | | | |
| C1,2 | ⚠S | ECKD1H223PF | 0.22 |
| C3 | ⚠S | ECQM1H223JZ | 0.22 |
| C4 | S | ECEB1VS102 | 1,000 |
| C5,6 | S | ECQM1H104JZ | 0.1 |
| C101 | S | ECEA50Z2R2 | 2.2 |
| C102 | S | ECEA1ES470 | 47 |
| C103 | S | ECEA50Z3R3 | 3.3 |
| C104 | S | ECEA50Z2R2 | 2.2 |
| C301 | S | ECCD1H680K | 68P |
| C302 | S | ECQM1H104JZ | 0.1 |
| C304 | S | ECEA1AS470 | 47 |
| C306 | S | ECQM1H104JZ | 0.1 |
| C307 | S | ECQM1H223JZ | 0.022 |
| C308 | S | ECEA50Z3R3 | 3.3 |
| C309 | | ECKD2H102KB | 0.001 |
| C401,402 | S | EQM1H223JZ | 0.022 |
| C403 | S | ECEA1CS330 | 33 |
| C404,405 | S | ECEA1AS470 | 47 |
| C601 | | ECFB1B104ZM | 0.1 |

## ■ TERMINALS OF MN1421FPC

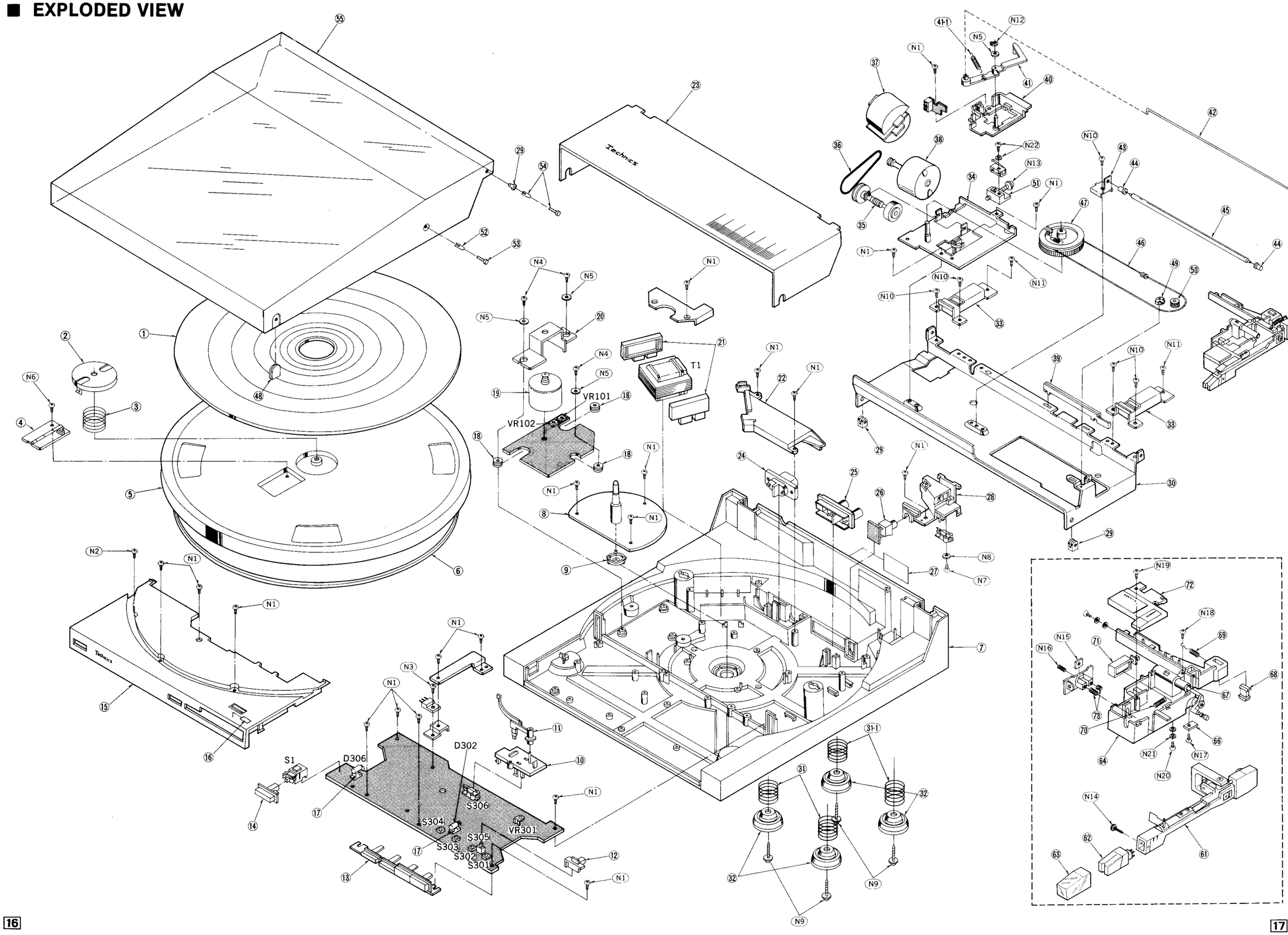
* These are the basic functions of MN1421FPC. Therefore, some terminals are not necessary or circuit functions may be partially changed depending on the purposes.

| No. | Mark | Description |
|---|---|---|
| 1 | VSS | Ground terminal |
| 2 | CO9 | Cueing control terminal ("H" during cueing and cueing down) |
| 3 | CO8 | Cueing control terminal ("H" only during cueing down – about 1 sec.) |
| 4<br>5<br>6 | CO7<br>CO6<br>CO5 | Key scan output terminal |
| 7<br>8<br>9<br>10 | A13<br>A12<br>A11<br>A10 | Key scan input terminal |
| 11<br>12 | B13<br>B12 | Auto size · speed select terminal<br>Terminal ⑪ , ⑫ "L" →<br>30cm record · 33rpm<br>Terminal ⑪ "L" ⑫ "H" pulse →<br>17cm record · 45rpm |
| 13 | B11 | Rest position detecting terminal ("H" when tonearm is at rest position) |
| 14 | B10 | Record detection terminal ("H" when record is present) |

| No. | Mark | Description |
|---|---|---|
| 15<br>16<br>17<br>18 | EO0<br>EO1<br>EO2<br>EO3 | Tonearm drive motor control terminal (Arm servo) |
| 19 | TEST | Test terminal (not used, connected to ground) |
| 20 | RST | Reset terminal (micom is reset at "L") |
| 21 | SNSO | Offset angle detection input terminal |
| 22 | SNS1 | Arm position detecting input terminal |
| 23 | DO0 | Turntable speed select terminal ("H" in 45rpm; "L" in 33rpm) |
| 24 | DO1 | Repeat indicator terminal (ON at "L") |
| 25 | DO2 | Synchro-rec on/off terminal ("H" at on; "L" at off) |
| 26 | DO3 | Turntable start/stop select terminal ("L" at start; "H" at stop) |
| 27 | VDD | Power supply (+5V) |
| 28<br>28 | OSC<br>OSC | Oscillation circuit (Clock frequency is adjusted to 30$\mu$s ±1$\mu$s) |

SL-3 SL-3

## ■ EXPLODED VIEW








## ■ REPLAC

**Notes:**

1. Part numb
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7. The paren
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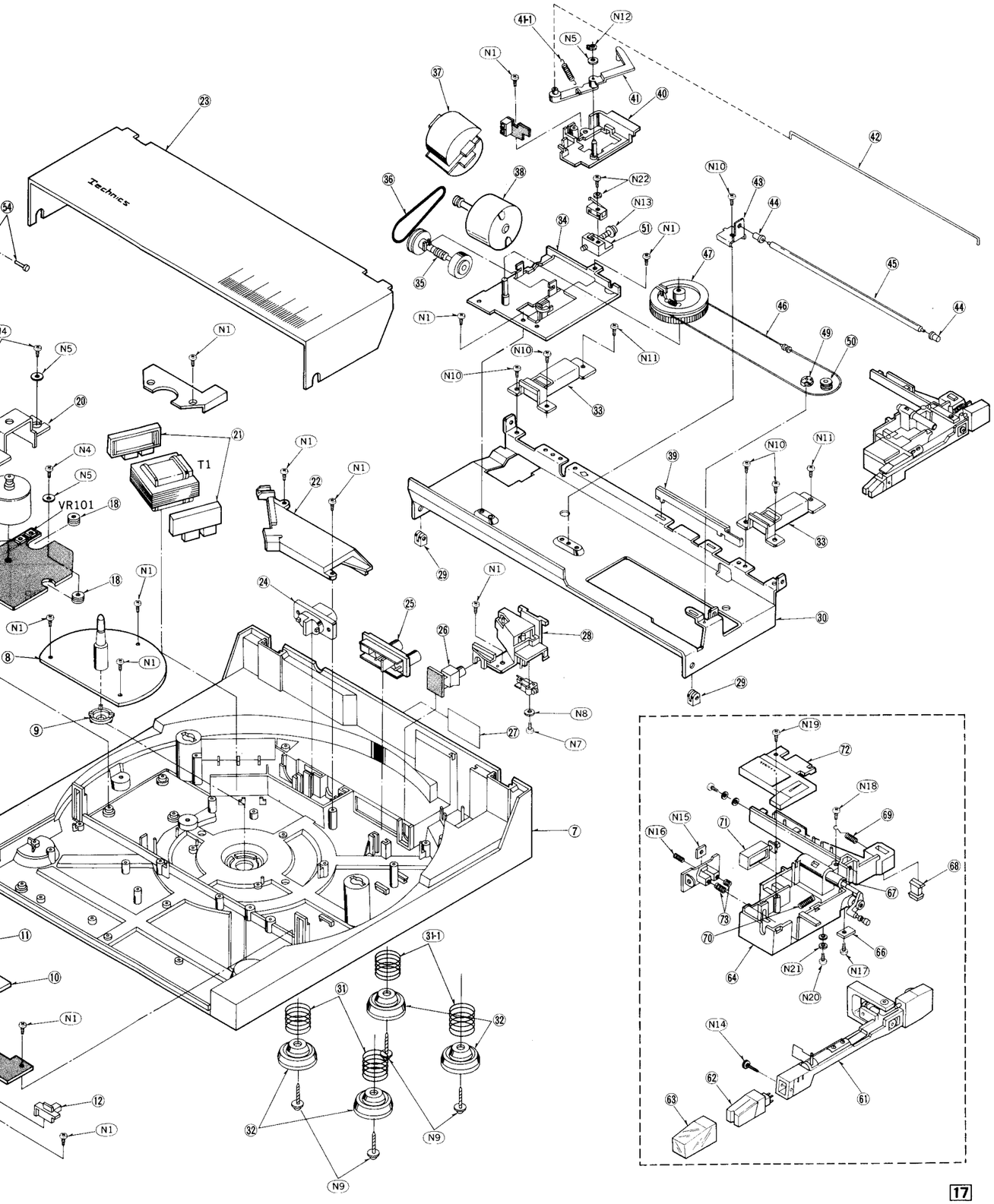
| Ref. No. | |
|---|---|
| **INTEGRATED CIRCUIT** | |
| IC1 | AN78 |
| IC2 | DN68 |
| IC101 | AN661 |
| IC301 | MN14 |
| IC401 | AN65 |
| **TRANSISTORS** | |
| Q1 | 2SD63 |
| Q101 | 2SD63 |
| Q102 | 2SK30 |
| Q301 | 2SD63 |
| Q303 | 2SD63 |
| Q304 | 2SD86 |
| Q305 | 2SB64 |
| Q306 | 2SD63 |
| Q307 | 2SD63 |
| Q308 | 2SB64 |
| Q309 | 2SD63 |
| Q401 | 2SD97 |
| Q402 | 2SD97 |
| Q403 | 2SD63 |
| Q404 | 2SD63 |
| **DIODE** | |
| D1 ⚠ | SVDSI |
| D2 | MA105 |
| D101 **S** | MA162 |
| D102 **S** | MA162 |
| D301 | MA107 |
| D302,306 | LN81C |
| D303 ~ 305 **S** | MA162 |
| D308 **S** | MA162 |
| D501 **S** | MA162 |
| **PHOTO INTERRUPTER** | |
| PC501 | ON 118 |
| **SWITCHES** | |
| S1 ⚠ | SFDSC |
| S301 ~ 304 | EVQQ |
| S305 | SFDSI |
| S306 | SFDSC |
| S307 | SFDSC |
| S601 | SFDSC |
| S901 (XA, XM only) ⚠ | SFDSI |
| **VARIABLE RESISTORS** | |
| VR101 | EVN51 |
| VR102 | EVN51 |
| VR301 | EVNK |








# ■ REPLACEMENT PARTS LIST

**Notes:**
1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
3. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.
4. The "**S**" mark is servico standard parts and may differ from production parts.
5. Ⓚ -marked parts are used for black only, while ○-marked parts are for silver type only.
6. Parts other than Ⓚ - and ○-marked are used for both black and silver types.
7. The parenthesized numbers in the columns of description stand for the quantity per set.

Black type model No. : SL3 (K)

**Areas**

* [E] is available in Switzerland and Scandinavia.
* [EK] is available in United Kingdom.
* [XL] is available in Australia.
* [EG] is available in F.R. Germany.
* [EB] is available in Belguim.
* [EF] is available in France.
* [XA] is available in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.
* [EH] is available in Holland.
* [Ei] is available in Italy.
* [EC] is available in Czechoslovakia.
* [XM] is available in Central South America.

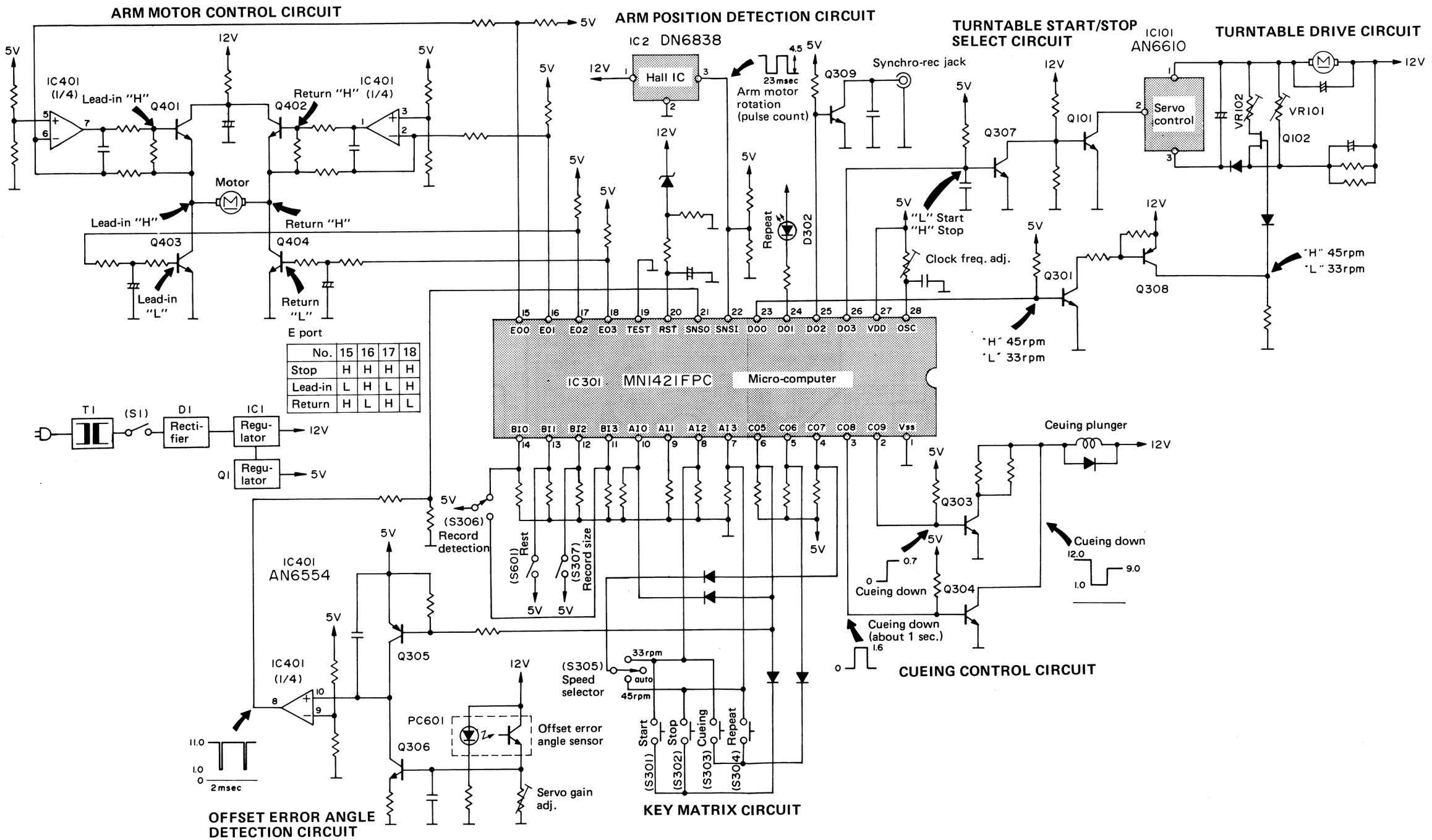
| Ref. No. | | Part No. | Description |
|---|---|---|---|
| **INTEGRATED CIRCUITS** | | | |
| IC1 | | AN78M12 | Regulator |
| IC2 | | DN6838S | Arm Position |
| IC101 | | AN6610 | DC Servo Control |
| IC301 | | MN1421FPC | Micro Computer |
| IC401 | | AN6554 | Comparator |
| **TRANSISTORS** | | | |
| Q1 | | 2SD638 | Regulator |
| Q101 | | 2SD638 | Turntable Start / Stop |
| Q102 | | 2SK301 | Speed Select |
| Q301 | | 2SD636 | Speed Select |
| Q303 | | 2SD636 | Cueing Control |
| Q304 | | 2SD892 | Cueing Control |
| Q305 | | 2SB641 | Offset angle Sensor |
| Q306 | | 2SD636 | Offset angle Sensor |
| Q307 | | 2SD636 | Turntable Start / Stop |
| Q308 | | 2SB641 | Speed Select |
| Q309 | | 2SD636 | Synchro-rec Select |
| Q401 | | 2SD973 | Arm Motor Control |
| Q402 | | 2SD973 | Arm Motor Control |
| Q403 | | 2SD638 | Arm Motor Control |
| Q404 | | 2SD638 | Arm Motor Control |
| **DIODE** | | | |
| D1 | ⚠ | SVDSIRBA20F | Rectifier |
| D2 | | MA1056 | 5.6V Zener |
| D101 | S | MA162A | Drive Motor Control |
| D102 | S | MA162A | Speed Select |
| D301 | | MA1075A | 7.5V Zener |
| D302,306 | | LN81CPH | Light Emitting Diode |
| D303 ~ 305 | S | MA162A | Key Matrix |
| D308 | S | MA162A | Key Matrix |
| D501 | S | MA162A | Key Matrix |
| **PHOTO INTERRUPTERS** | | | |
| PC501 | | 0N 1186 | Offset Angle |
| **SWITCHES** | | | |
| S1 | ⚠ | SFDSC02N02 | Power |
| S301 ~ 304 | | EVQQJR02K | Start, Stop, Cueing, Repeat |
| S305 | | SFDSHSW0699 | Speed Selector |
| S306 | | SFDSC02N01 | Record Size Selector |
| S307 | | SFDSC05N02 | Record Size Selector |
| S601 | | SFDSC02N03 | Rest |
| S901 [XA. XM only] | ⚠ | SFDSHXW225-2 | Voltage Adjuster |
| **VARIABLE RESISTORS** | | | |
| VR101 | | EVN51AA00B53 | 33r. p. m Adjuster 5KΩ(B) |
| VR102 | | EVN51AA00B23 | 45r.p.m Adjuster 2KΩ(B) |
| VR301 | | EVNK6AA00B54 | Clock Frequency Adjuster 50KΩ(B) |

| Ref. No. | | Part No. | Description |
|---|---|---|---|
| **VARIABLE RESISTORS** | | | |
| VR501 | S | EVNM0AA00B53 | Servo Gain Adjuster 5KΩ(B) |
| **FUSES** | | | |
| F1 | ⚠ | XBAS2C04T1B | T 400mA, 250V |
| F2 [XA, XM only] | ⚠ | XBAS2C01T1B | T 100mA, 250V |
| **POWER TRANSFORMER** | | | |
| T1 [EK, XL] | ⚠ | SLT48DTE16E | Power Source |
| T1 [XA, XM] | ⚠ | SLT48DT17E | Power Source |
| T1 [Other Areas] | ⚠ | SLT48DT15E | Power Source |

| Ref. No. | | Part No. | Description | |
|---|---|---|---|---|
| **CABINET and CHASSIS PARTS** | | | | |
| 1 | | SFTGC02N01 | Turntable Mat | (1) |
| 2 | | SFWEC02N01 | 45 rpm Adaptor | (1) |
| 3 | | SFQAC06N01 | Spring | (1) |
| 4 | | SFUMC05N11A | Record Detector | (1) |
| 5 | | SFTEC02N01A | Turntable Platter | (1) |
| 6 | | SFGB321-1 | Belt | (1) |
| 7 | ○ | SFACC02N01 | Cabinet (Silver ) | (1) |
| 7 | Ⓚ | SFACC02N21 | Cabinet (Black ) | (1) |
| 8 | | SFTJC02N01Z | Turntable Shaft Assy' | (1) |
| 9 | | SFUMC02N19 | Cap | (1) |
| 10 | | SFUMC02N35 | Cover, Switch, S306 | (1) |
| 11 | | SFUMC02N33E | Lever, Record detector | (1) |
| 12 | | SFKTC02N03 | Knob, Speed Selector | (1) |
| 13 | | SFKTC02N01A | Knob Assy, Control | (1) |
| 14 | | SFKTC02N02A | Knob, Power | (1) |
| 15 | ○ | SFUMC02N01 | Cover, Front Cabinet (Silver) | (1) |
| 15 | Ⓚ | SFUMC02N21 | Cover, Front Cabinet ( Black ) | (1) |
| 16 | | SFKKC05N02 | Label, Speed Selector | (1) |
| 17 | | SFUMC02N09 | Holder, Diode, D302,D306 | (2) |
| 18 | | SFGZB33N01 | Cushion Rubber | (1) |
| 19 | | SFMHL11R21E | Motor Ass'y ( with Pulley ) | |
| 20 | | SFUPL11R21 | Guide, Motor | (1) |
| 21 | | SFGCC02N02 | Cushion Rubber, Transformer | (1) |
| 22 | | SFUMC02N04 | Cover, Power | (1) |
| 23 | | SFUMC02N08 | Cover, Tonearm | (1) |
| 24 [XA,XM] | | SFDJHSC04912 | Socket, AC | (1) |
| 24 [EK, XL] | | SFDJHSC0492 | Socket, AC | (1) |
| 24 [Other Areas] | | SFDJHSC0491 | Socket, AC | (1) |
| 25 | | SFDJC03N08E | Jack, Output | (1) |
| 26 | | SFDJC06N02 | Jack, Synchro - rec | (1) |
| 27 [E,EC] | | SFNNC03S01 | Name Plate | (1) |
| 27 [EK,XL] | | SFNNC03G01 | Name Plate | (1) |
| 27 [XA,XM] | | SFNNC03X01 | Name Plate | (1) |
| 27 [Other Areas] | | SFNNC03R01 | Name Plate | (1) |
| 28 | | SFUMC02N03A | Lever Ass'y, Record detector | (1) |
| 29 | | SFGZC02N02 | Rubber, Dust Cover | (2) |
| 30 | | SFUKC02N01E | Plate Ass'y, Tonearm | (1) |
| 31 | | SFQCC02N01 | Spring, Audio Insulator ( Front ) | (2) |
| 31-1 | | SFQCC02N02 | Spring, Audio Insulator ( Rear ) | (2) |

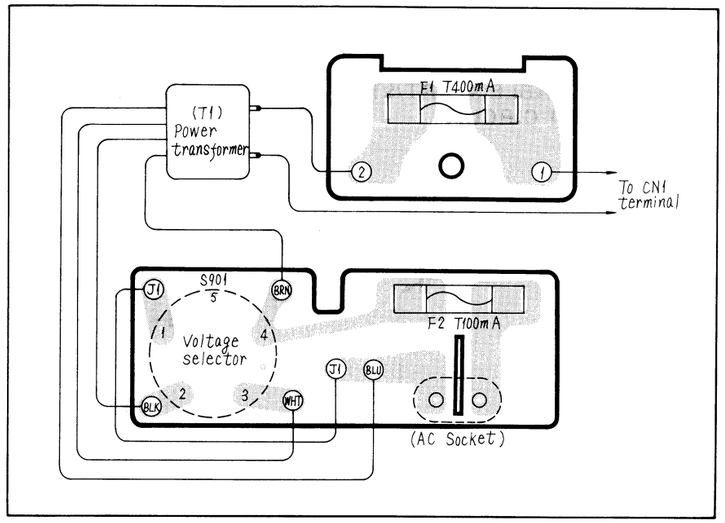
| Ref. No. | | Part No. | Description | |
|---|---|---|---|---|
| **CABINET and CHASSIS PARTS** | | | | |
| 32 | | SFGAC05N02 | Audio Insulator | (4) |
| 33 | | SFATC02N01E | Hinge, Dust Cover | (2) |
| 34 | | SFUPC02N01E | Plate Ass'y, Tonearm | (1) |
| 35 | | SFUML11R02A | Worm Ass'y | (1) |
| 36 | | SFGBC10-01 | Belt, Tonearm | (1) |
| 37 | | SFUMC02N07 | Cover, Tonearm Motor | (1) |
| 38 | | SFMHC02N01E | Motor Ass'y, Tonearm Drive | (1) |
| 39 | | SFUMC02N12 | Holder, Lead Wire | (1) |
| 40 | | SFUMC02N13 | Plate Ass'y, Rest Switch | (1) |
| 41 | | SFUMC02N05 | Lever, Rest Switch | (1) |
| 41-1 | | SFQHQ34N22 | Spring, Rest Switch Lever | (1) |
| 42 | | SFUZC02N01 | Rod, Rest Switch | (1) |
| 43 | | SFUPC02N03 | Bracket, Guide Rail | (1) |
| 44 | | SFGCC05N05 | Cap, Guide Rail Rubber | (1) |
| 45 | | SFXJC02N03 | Guide Rail | (1) |
| 46 | | SFUZC05N02E | Lope Ass'y | (1) |
| 47 | | SFUML11R03 | Arm Drive Wheel | (1) |
| 48 | | SFGCC02N01 | Rubber, Dust Cover | (2) |
| 49 | | SFUMC06N11 | Cap | (1) |
| 50 | | SFUMC05N22 | Pulley | (1) |
| 51 | | SFQA913 — 01 | Spring | (1) |
| 52 | | SFUMC02N04 | Holder | (2) |
| 53 | | SFUMC02N15 | Latch, Dust Cover | (2) |
| 54 | | SFUMC02N18 | Latch, Dust Cover | (2) |
| 55 | | SFADC02N01 | Dust Cover | (1) |
| **TONEARM PARTS** | | | | |
| 61 | | SFPAM00301A | Tonearm | (1) |
| 62 | ★ | EPC - P24S | Cartridge | (1) |
| | ★ | EPS - 24CS | Stylus | (1) |
| 63 | | SFCNC02301 | Cover, Stylus | (1) |
| 64 | | SFPKD00301R | Base, Tonearm | (1) |
| 66 | | SFPZB00301 | Plate | (1) |
| 67 | | SFPJU00301 | Bracket, Guide Rail | (1) |
| 68 | | SFPGML1101 | Rubber | (1) |
| 69 | | SFPSP00304 | Spring | (1) |
| 70 | | SFPSP00504 | Spring | (1) |
| 71 | | SFDZC05N01E | Cueing Plunger | (1) |
| 72 | | SFPCS00301 | Cover, Tonearm Position | (1) |
| 73 | | SFPSP00302 | Spring | (2) |
| **SCREWS, WASHERS and CIRCLIPS** | | | | |
| N1 | S | XTV 3+8 BFN | Screw, ⊕3X8 | (15) |
| N2 | S | XTV 3+20 BFN | Screw, ⊕3X20 | (1) |
| N3 | | XTN 3+ C5S | Screw, ⊕3X5 | (1) |
| N4 | | SFXG 172-01 | Screw, | (3) |
| N5 | S | XWE3 | Washer, Φ3 | (3) |
| N6 | S | XTN 3+6 BFZ | Screw, ⊕3X6 | (1) |
| N7 | | XTN 2+10B | Screw, ⊕2X10 | (1) |
| N8 | S | XWE2BW | Washer, Φ2 | (1) |
| N9 | | XTW 3+12 | Screw, ⊕3X12 | (4) |
| N10 | S | XTV 3+6 BFN | Screw, ⊕3X6 | (5) |
| N11 | | XTWS 3+14TFZ | Screw, ⊕3X14 | (2) |
| N12 | | CSTW3 | Washer, Φ3 | (1) |
| N13 | | XSN 3+30S | Screw, ⊕3X30 | (1) |
| N14 | | SFPEV00502 | Screw, Cartridge | (1) |
| N15 | | SFXN 623-1 | Nut | (1) |
| N16 | | XXE3D10FZS | Screw, ⊕3X10 | (1) |
| N17 | S | XTN 2+4B | Screw, ⊕2X4 | (1) |
| N18 | S | XTN 3+8 BFZ | Screw, ⊕3X8 | (1) |
| N19 | | XTN 26+6 BFZ | Screw, ⊕2.6X6 | (1) |
| N20 | | XSN 2+4 | Screw, ⊕2X4 | (1) |
| N21 | S | XWA2B | Washer, Φ2 | (1) |
| N22 | | XTN 16+10G | Screw, ⊕1.6X10 | (1) |

## ■ BLOCK DIAGRAM



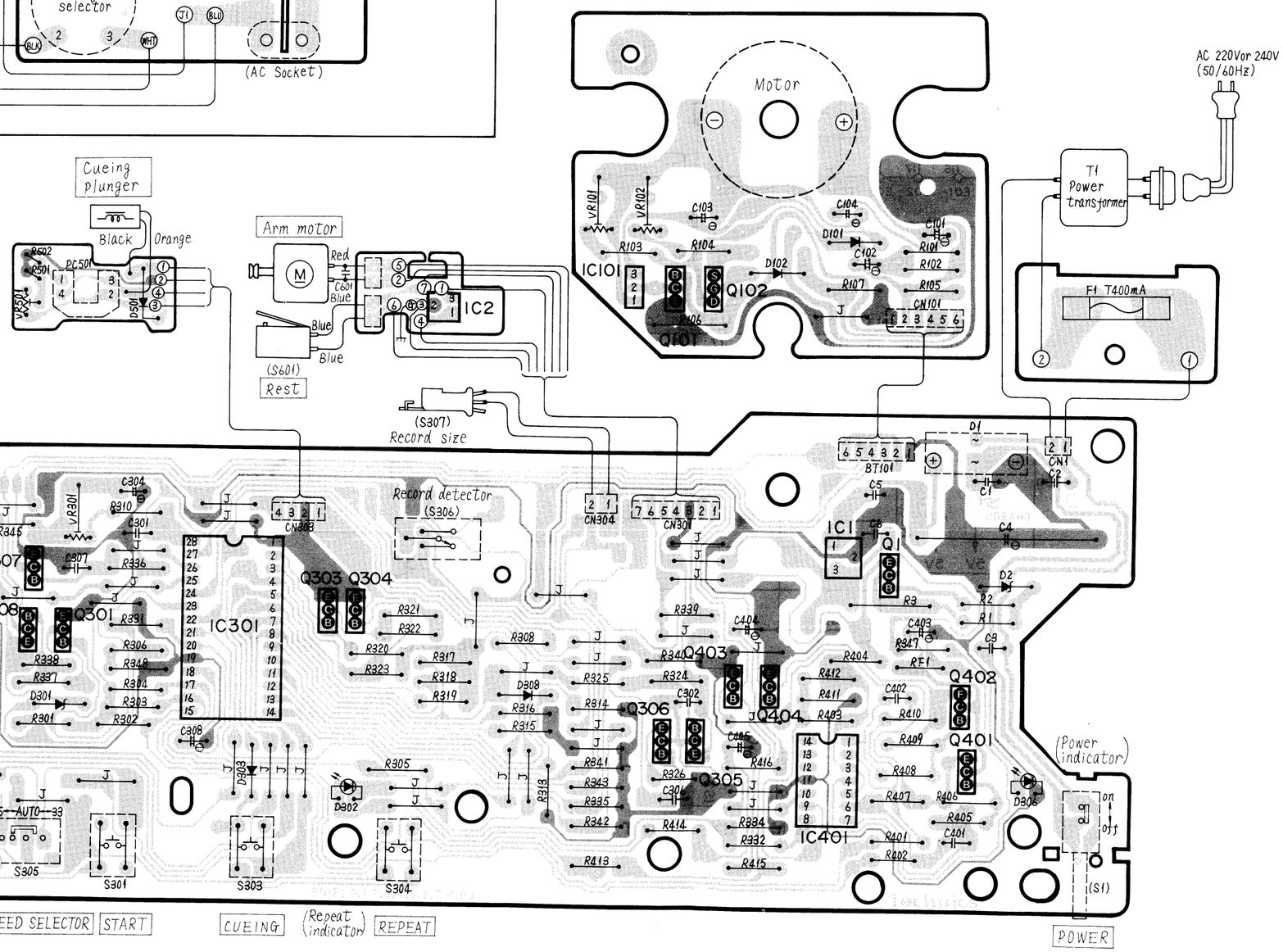
## ■ CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM

Ground (Earth) lines




- **Power supply circuit**

(For Southeast Asia, Oceania, Africa, Middle Near East and Central South America)

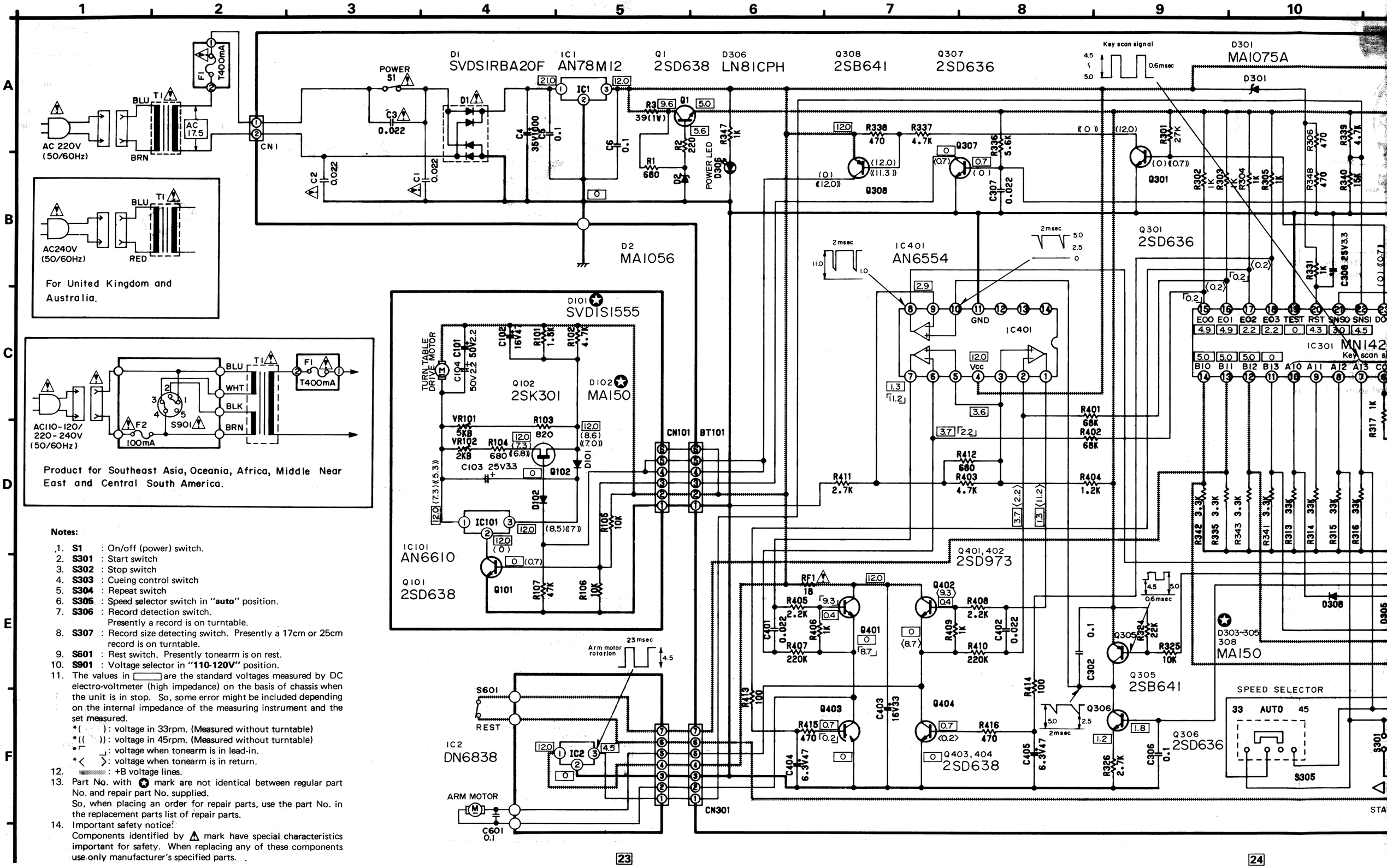



- **Terminal guide of transistors, photo interrupters and IC's.**

| | |
|---|---|
| AN78M12 | 2SD638, 2SD636<br>2SB641, 2SD973 |
| DN6838 | 2SD892 |
| MN1421FPC | 2SK301<br>1. Drain<br>2. Gate<br>3. Source |
| AN6554 | ON1186 |
| AN6610 | |

## ■ SCHEMATIC DIAGRAM

(This schematic diagram may be modified at any time with the development of new technology.)




**Notes:**

1. **S1** : On/off (power) switch.
2. **S301** : Start switch
3. **S302** : Stop switch
4. **S303** : Cueing control switch
5. **S304** : Repeat switch
6. **S305** : Speed selector switch in "**auto**" position.
7. **S306** : Record detection switch.
   Presently a record is on turntable.
8. **S307** : Record size detecting switch. Presently a 17cm or 25cm record is on turntable.
9. **S601** : Rest switch. Presently tonearm is on rest.
10. **S901** : Voltage selector in "**110-120V**" position.
11. The values in ▭ are the standard voltages measured by DC electro-voltmeter (high impedance) on the basis of chassis when the unit is in stop. So, some error might be included depending on the internal impedance of the measuring instrument and the set measured.
    *( ) : voltage in 33rpm. (Measured without turntable)
    *(( )) : voltage in 45rpm. (Measured without turntable)
    *⌐ ⌙ : voltage when tonearm is in lead-in.
    *< > : voltage when tonearm is in return.
12. ▒▒ : +B voltage lines.
13. Part No. with ✪ mark are not identical between regular part No. and repair part No. supplied.
    So, when placing an order for repair parts, use the part No. in the replacement parts list of repair parts.
14. Important safety notice!
    Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

th the development of new technology.)

5 6 7 8 9 10 11 12 13 14

IC1 A20F AN78M12 | Q1 2SD638 | D306 LN81CPH | Q308 2SB641 | Q307 2SD636 | D301 MA1075A | D302 LN81CPH

Key scan signal 4.5 / 5.0 0.6msec

Cueing up 0 down 0.7

D501 MA150 | PC501 ON1186

CUEING PLUNGER

Clock freq. adj.

Servo gain adj.

D2 MA1056

D101 SVDIS1555

Q102 2SK301 | D102 MA150

IC401 AN6554

Q301 2SD636

IC301 MN1421FPC

Key scan signal

Q309 2SD636

FC301

SYNCHRO REC OUT

CN303

CN101 BT101

CN301

Q401, 402 2SD973

Q403, 404 2SD638

Q305 2SB641

Q306 2SD636

Q303 2SD636

Q304 2SD892

D303~305 308 MA150

D306 POWER LED

D308

S306

S307

SIZE SELECT

CARTRIDGE WHT RED GND OUTPUT L R

SPEED SELECTOR 33 AUTO 45

S301 S302 S303 S304 S305

START STOP CUEING REPEAT

Arm motor rotation 23msec 4.5

IC2

23 24 25

## ■ TROUBLE SHOOTING

To repair and check the unit . . . . .
(Refer to "How to remove the parts.")

- **Main circuit (micro-computer, arm motor control and power supply circuit):**
  Remove the turntable platter and control knob cover, and open the upper cabinet. **(Fig. 26)**
- **Turntable drive circuit:**
  Remove the turntable platter and open the upper cabinet.
- **Offset angle detecting sensor and arm position detecting Hall IC:**
  Remove the dust cover and tonearm cover.

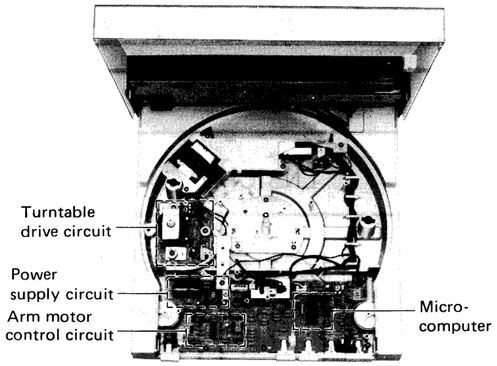
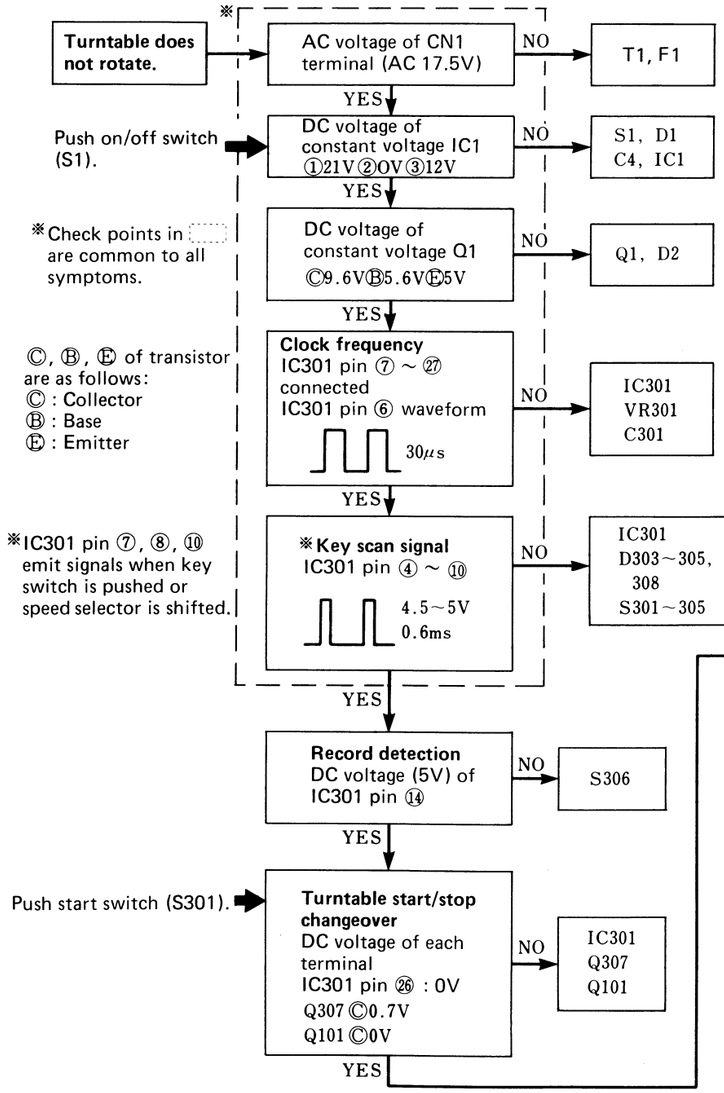
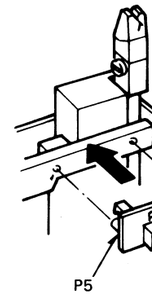



Fig. 26


※
Turntable does not rotate.
AC voltage of CN1 terminal (AC 17.5V)
NO
T1, F1
YES
Push on/off switch (S1).
DC voltage of constant voltage IC1 ①21V ②0V ③12V
NO
S1, D1 C4, IC1
YES
※Check points in ⋯ are common to all symptoms.
DC voltage of constant voltage Q1 ©9.6V Ⓑ5.6V Ⓔ5V
NO
Q1, D2
YES
Ⓒ, Ⓑ, Ⓔ of transistor are as follows:
Ⓒ : Collector
Ⓑ : Base
Ⓔ : Emitter
Clock frequency
IC301 pin ⑦ ~ ㉗ connected
IC301 pin ⑥ waveform
30μs
NO
IC301 VR301 C301
YES
※IC301 pin ⑦, ⑧, ⑩ emit signals when key switch is pushed or speed selector is shifted.
※Key scan signal
IC301 pin ④ ~ ⑩
4.5~5V
0.6ms
NO
IC301 D303~305, 308 S301~305
YES
Record detection
DC voltage (5V) of IC301 pin ⑭
NO
S306
YES
Push start switch (S301).
Turntable start/stop changeover
DC voltage of each terminal
IC301 pin ㉖ : 0V
Q307 Ⓒ0.7V
Q101 Ⓒ0V
NO
IC301 Q307 Q101
YES
Drive circuit
DC voltage of IC101
NO 1 2 3
33rpm 7.3V 0V 8.5V
45rpm 5.3V 0V 7V
NO
IC101 Drive motor
Arm motor does not rotate.
Push start (S301) and stop (S302) switches.
Note:
The tonearm first moves slowly (about 5 mm from start position) and soon moves fast.
Motor control circuit
DC voltage of IC301 pin ⑮ ~ ⑱
NO 15 16 17 18
Stop 4.9 4.9 2.2 2.2
Lead-in 0.2 4.9 0.2 2.2
Return 4.9 0.2 4.9 0.2
NO
IC301
YES
DC voltage of IC401 pin ① ~ ③, ⑤ ~ ⑦.
NO 1 2 3
Stop 1.3 3.7 3.6
Lead-in 1.3 3.7 3.6
Return 11.2 2.2 3.6
NO 5 6 7
Stop 3.6 3.7 1.3
Lead-in 3.6 2.2 11.2
Return 3.6 3.7 1.3
NO
IC401
YES
DC voltage of Q401 ~ 404
Q401 Q403
Ⓑ Ⓔ Ⓑ Ⓒ
Stop 0.4 0 0.7 0
Lead-in 9.3 8.7 0.2 8.7
Q402 Q404
Ⓑ Ⓔ Ⓑ Ⓒ
Stop 0.4 0 0.7 0
Return 9.3 8.7 0.2 8.7
NO
RF1 (18Ω) Q401 ~ Q404 Arm drive motor
Speed cannot be changed.
※ ⊓⊓ (0V pulse)
⊓_⊓ (5V pulse)
Auto speed, size select circuit DC voltage of IC301 pin ⑪, ⑫.
※
Record \ NO 11 12
17cm, 25cm 0V 5V
30cm 0V ⊓⊓
None ⊓_⊓ 5V
NO
S306 S307 IC301
YES
Shift the speed select switch (S305) to "33" or "45".
1. DC voltage of IC301 pin ㉓ 33rpm0V, 45rpm 0.7V
2. DC voltage of Q301 Ⓒ. 33rpm12V, 45rpm 0V
3. DC voltage of Q308 Ⓒ. 33rpm0V, 45rpm 12V
4. DC voltage of D102 cathode 33rpm0V, 45rpm 12V
NO
IC301 Q301 Q308 D102 Q102 S305
Cueing down/up does not work.
Push cueing switch (S303).
Cueing control circuit
1. DC voltage of IC301 pin ②, ③.
Pin ② . . . 0.8V during cueing and down.
Pin ③ . . . 1.6V only during cueing down (1 sec.)
NO
IC301 S303
YES
DC voltage of Q304 Ⓒ.
12V Up 9V 1V Down
NO
Q303 Q304 Plunger
Lead-in, return defective with 17cm record.
Arm position detection circuit
DC voltage of Hall IC (IC2)
①12V ②0V ③4.5V
NO
IC2
YES
Clearance between Hall IC and magnet
NO
Adjust (see Fig. 19)
YES
Push start switch (S301).
Waveform of Hall IC terminal ③ during arm motor rotation.
4.5V
23ms
NO
IC2 IC301
Synchro recording is not possible.
Push cueing switch (S303).
1. DC voltage of IC301 pin ㉕
0.7V Down 0 Up
2. Conduction between Q309 Ⓒ and Ⓔ.
Down . . . . Short
Up . . . . . Open
NO
IC301 Q309 Synchro-rec jack

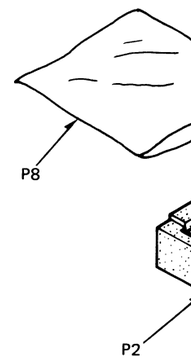
## ■ PACKING

1. Open the upper
   place.
2. Fit the turntabl
   cover spacer in p




3. Put the set into
   the package as sh

Turnt




| Ref. No. | Part No. |
|---|---|
| **ACCESSORIES** | |
| **A1** (EK) | SFNUC02G01 |
| **A1** (XA, XM) | SFNUC02X01 |
| **A1** (EG) | SFNUC02R01 |
| **A1** (EF) | SFNUC02F01 |
| **A1** (EI) | SFNUC02I01 |
| **A1** (Other Areas) | SFNUC02S01 |
| A1 (XL) | SFNUC02L01 |
| A2 | SFHDC05N01 |
| A3 | SFDLC05N01 |
| **A4** (XL) S △ | RJA26Z |
| **A4** (EK) S △ | RJA43Z |
| **A4** △ (XA, XM) S | QFC1103 |
| **A4** (Other) S (Areas) △ | RJA20Z |
| A5 | SFUMC05N24 |
| A6 (XA) only | SFDKI19118 |

**Motor control circuit**
DC voltage of IC301 pin ⑮ ~ ⑱

| NO | 15 | 16 | 17 | 18 |
|---|---|---|---|---|
| Stop | 4.9 | 4.9 | 2.2 | 2.2 |
| Lead-in | 0.2 | 4.9 | 0.2 | 2.2 |
| Return | 4.9 | 0.2 | 4.9 | 0.2 |

NO → IC301

YES

**Arm motor does not rotate.**

Push start (S301) and stop (S302) switches.

DC voltage of IC401 pin ① ~ ③, ⑤ ~ ⑦.

| NO | 1 | 2 | 3 |
|---|---|---|---|
| Stop | 1.3 | 3.7 | 3.6 |
| Lead-in | 1.3 | 3.7 | 3.6 |
| Return | 11.2 | 2.2 | 3.6 |

| NO | 5 | 6 | 7 |
|---|---|---|---|
| Stop | 3.6 | 3.7 | 1.3 |
| Lead-in | 3.6 | 2.2 | 11.2 |
| Return | 3.6 | 3.7 | 1.3 |

NO → IC401

YES

DC voltage of Q401 ~ 404

| | Q401 | | Q403 | |
|---|---|---|---|---|
| | Ⓑ | Ⓔ | Ⓑ | Ⓒ |
| Stop | 0.4 | 0 | 0.7 | 0 |
| Lead-in | 9.3 | 8.7 | 0.2 | 8.7 |

| | Q402 | | Q404 | |
|---|---|---|---|---|
| | Ⓑ | Ⓔ | Ⓑ | Ⓒ |
| Stop | 0.4 | 0 | 0.7 | 0 |
| Return | 9.3 | 8.7 | 0.2 | 8.7 |

NO → RF1 (18Ω) Q401 ~ Q404 Arm drive motor

**Speed cannot be changed.**

※ ⌐¯¯¬ (0V pulse)
⌐_¬ (5V pulse)

Auto speed, size select circuit DC voltage of IC301 pin ⑪, ⑫.

| Record \ NO | 11 | 12 |
|---|---|---|
| 17cm, 25cm | 0V | 5V |
| 30cm | 0V | ⌐¯¯¬ |
| None | ⌐_¬ | 5V |

※

NO → S306 S307 IC301

YES

Shift the speed select switch (S305) to "33" or "45".

1. DC voltage of IC301 pin ㉓ 33rpm0V, 45rpm 0.7V
2. DC voltage of Q301 Ⓒ. 33rpm12V, 45rpm 0V
3. DC voltage of Q308 Ⓒ. 33rpm0V, 45rpm 12V
4. DC voltage of D102 cathode 33rpm0V, 45rpm 12V

NO → IC301 Q301 Q308 D102 Q102 S305

**Cueing down/up does not work.**

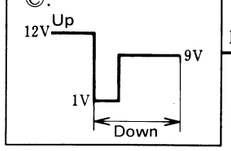
**Cueing control circuit**
1. DC voltage of IC301 pin ②, ③.
Pin ② . . . 0.8V during cueing and down.
Pin ③ . . . 1.6V only during cueing down (1 sec.)

Push cueing switch (S303).

NO → IC301 S303

YES

DC voltage of Q304 Ⓒ.




NO → Q303 Q304 Plunger

**Lead-in, return defective with 17cm record.**

**Arm position detection circuit**
DC voltage of Hall IC (IC2)
①12V ②0V ③4.5V

NO → IC2

YES

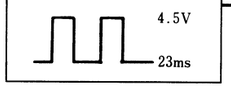
Clearance between Hall IC and magnet

NO → Adjust (see Fig. 19)

YES

Push start switch (S301).

Waveform of Hall IC terminal ③ during arm motor rotation.




NO → IC2 IC301

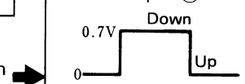
C101

3
.5V
7V

NO → IC101 Drive motor

**Synchro recording is not possible.**

1. DC voltage of IC301 pin ㉕




2. Conduction between Q309 Ⓒ and Ⓔ.
Down . . . Short
Up . . . . . Open

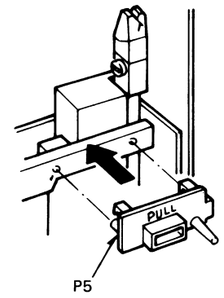
Push cueing switch (S303).

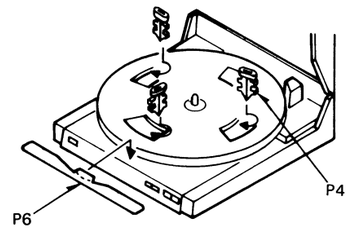
NO → IC301 Q309 Synchro-rec jack



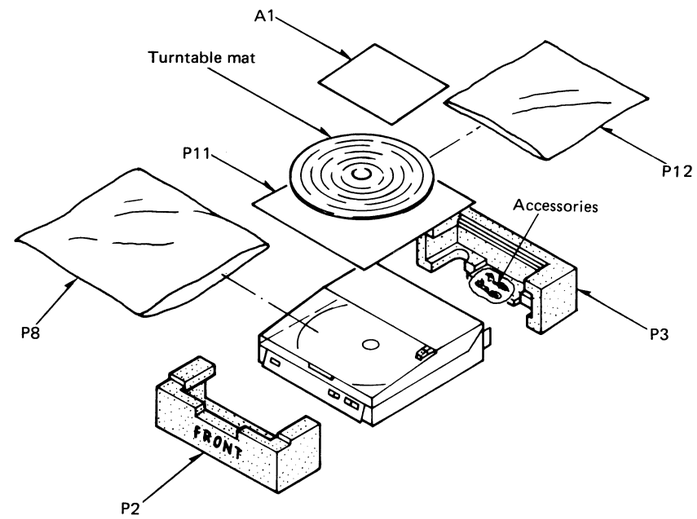
## ■ PACKING

1. Open the upper cabinet and fit the spacer in place.
2. Fit the turntable platter clamper and dust cover spacer in place.

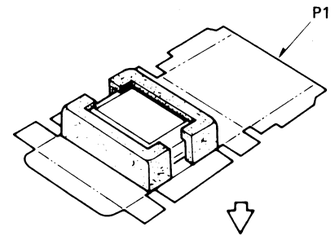


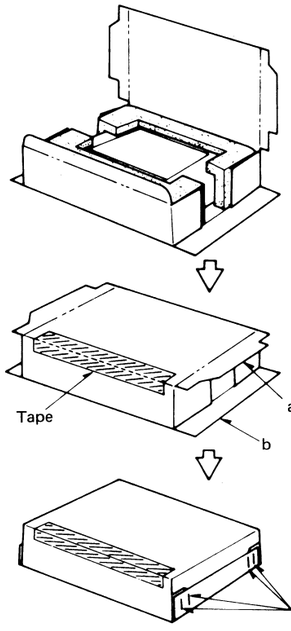




3. Put the set into polyethylene bag, and make the package as shown below.

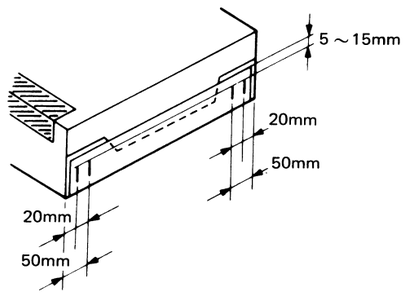



4. Plase the unit (with cushions attached) as illustrated.
5. Fold the flaps according to the line marks.
6. Seal the top with adhesive tape.
   * Use gum tape or adhesive cloth tape of 50mm wide at least.
7. For the edges, first fold the flap "a" and then flap "b", and staple. Remember to staple only flap "b". (Use 15 or 16mm staple)




* Stapling positions are shown below.




| Ref. No. | Part No. | Description | |
|---|---|---|---|
| **ACCESSORIES** | | | |
| **A1**〔EK,〕 | SFNUC02G01 | Instruction Book | (1) |
| **A1** 〔XA, XM〕 | SFNUC02X01 | Instruction Book | (1) |
| **A1**〔EG〕 | SFNUC02R01 | Instruction Book | (1) |
| **A1**〔EF〕 | SFNUC02F01 | Instruction Book | (1) |
| **A1**〔EI〕 | SFNUC02I01 | Instruction Book | (1) |
| **A1**〔Other Areas〕 | SFNUC02S01 | Instruction Book | (1) |
| A1〔XL〕 | SFNUC02L01 | Instruction Book | (1) |
| A2 | SFHDC05N01 | Phono Cord | (1) |
| A3 | SFDLC05N01 | Ground Wire | (1) |
| **A4**〔XL〕S△ | RJA26Z | AC Cord | (1) |
| **A4**〔EK〕S△ | RJA43Z | AC Cord | (1) |
| **A4** △ 〔XA, XM〕S | QFC1103 | AC Cord | (1) |
| **A4**〔Other〕S〔Areas〕△ | RJA20Z | AC Cord | (1) |
| A5 | SFUMC05N24 | Adaptor, 25cm Record | (1) |
| A6〔XA〕only | SFDKI19118 | 2P Plug | (1) △ |

| Ref. No. | Part No. | Description | |
|---|---|---|---|
| **PACKING PARTS** | | | |
| **P1**〔EF〕○ | SFHPC02C01 | Carton Box (Silver) | (1) |
| **P1**〔EF〕Ⓚ | SFHPC02C21 | Carton Box (Black) | (1) |
| **P1**〔Other Areas〕○ | SFHPC02M01 | Carton Box (Silver ) | (1) |
| **P1**〔Other Areas〕Ⓚ | SFHPC02M21 | Carton Box (Black) | (1) |
| P2 | SFHHC02N01 | Pad, Front | (1) |
| P3 | SFHHC02N02 | Pad, Rear | (1) |
| P4 | SFHKC05N01 | Clamper, Turntable | (3) |
| P5 | SFHKC02N01 | Spacer, Tonearm | (1) |
| P6 | SFHSC06N01 | Spacer, Dust Cover | (1) |
| P7 | SFYR13C120Y | Ribon, Belt | (1) |
| P8 | SFYH45×50 | Polyethylene Bag, Cabinet | (1) |
| P9 | SFYH17×16 | Polyethylene Bag, Accessories | (1) |
| P10 | SFYF05A06 | Polyethylene Bag, 25cm Adaptor | (1) |
| P11 | SFHDD05N01 | Pad.Turntable Mat | (1) |
| P12 | SFYF33B35 | Polyethlene Bag Turntable Mat | (1) |

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